JUNE 17, 1961

Chemical Week

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Plastics makers launch new products, new selling drive at New York show . p. 23

Inside Sicily: oil, minerals and strategic location hypo CPI growth p. 29

Computer lease plan opens door wider to efficiency-boosting plant studies . . . p. 77

Technical service— companies take stock, look for ways to cut costs . . . . . p. 93

◀ HIGH-RIDING MAGNESIUM GETS PROCESS LIFT . p. 71

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Houdry blueprint for dehydrogenation utilizes Mutual Chromium Chemicals

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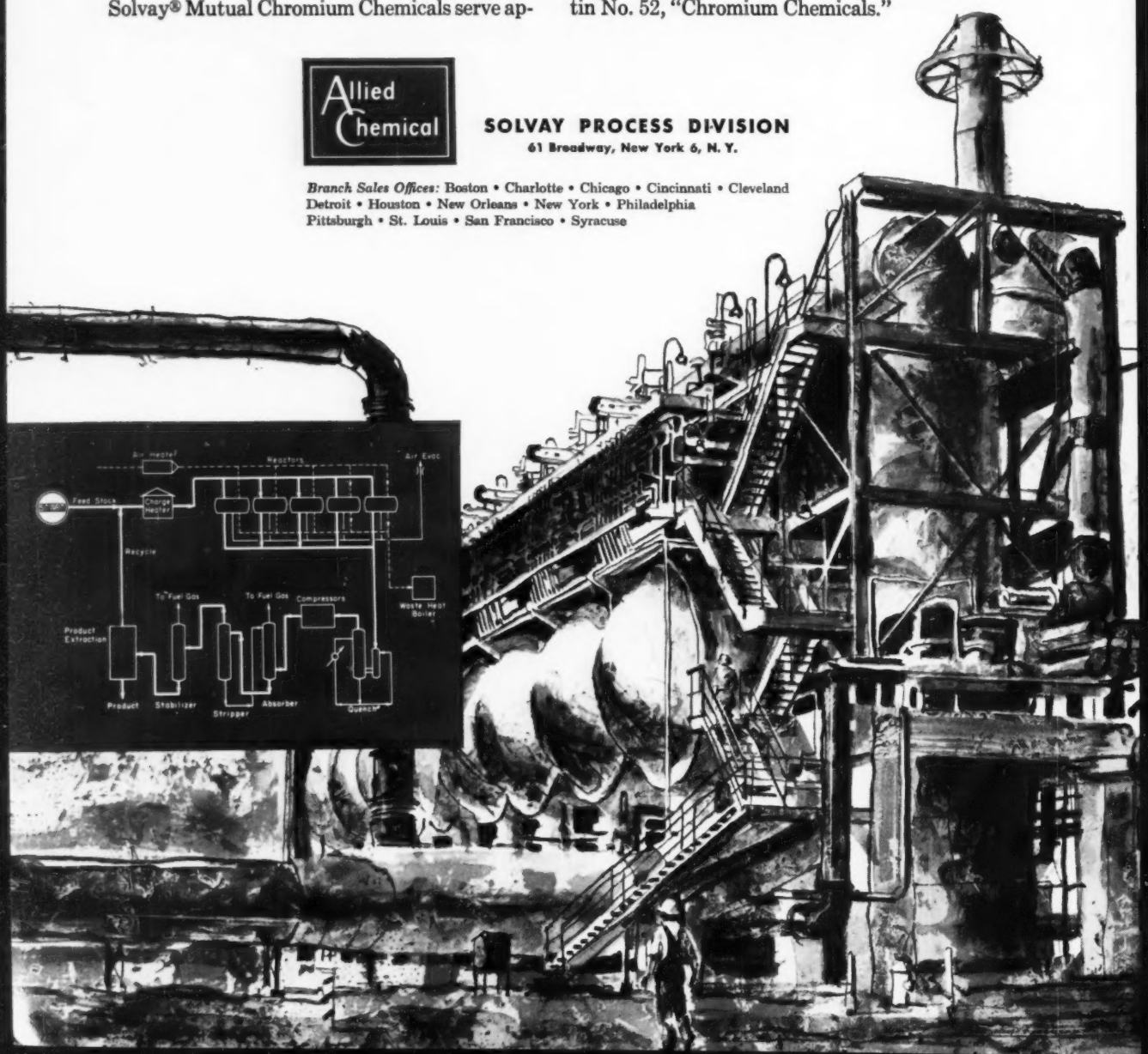

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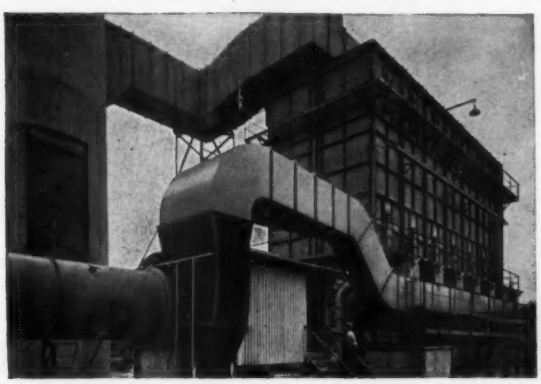

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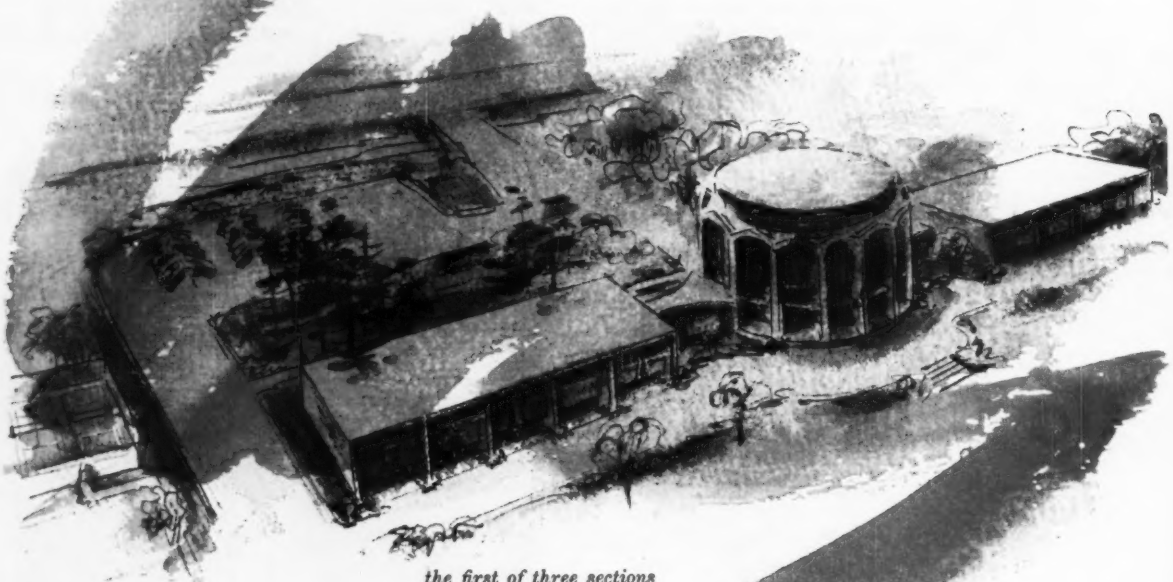

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ON THE COVER: West German auto maker Volkswagen GmbH. is world's biggest user of magnesium. Its need for 150,000 tons/year has fostered a new magnesium process (p. 71).

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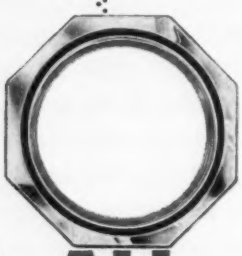

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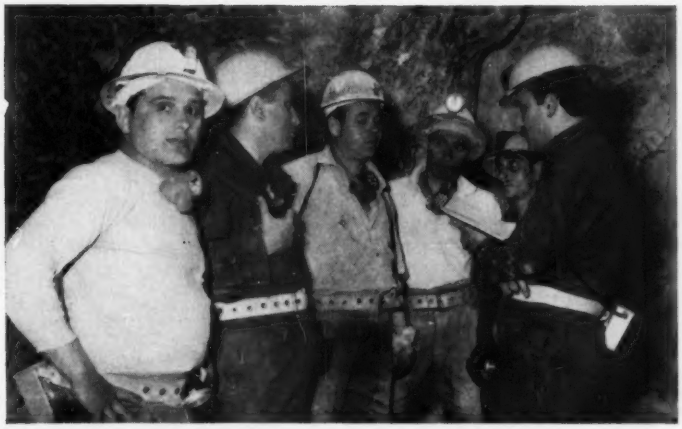

CW's DiRaimondo (right) 230 ft. down in Sicilian potash mine.

Our Man in the Mine

Gene DiRaimondo likes to see for himself. Last month, on assignment from CHEMICAL WEEK, he took a careful look at the mushrooming chemical process industries of Sicily—a focal point for U.S. investment in the bustling Mediterranean trade area.

For 10 days, DiRaimondo crisscrossed Sicily and the boot of Italy, talking with the men who are shaping the future of the awakening island. His travels took him from the rarefied air of industry's executive suites to the dank depths of Sicily's potash mines (*above*).

Everywhere DiRaimondo went, he looked—and listened. The result of his reportorial scrutiny shows up on p. 29 of this issue—a study in depth of Sicilian industry striving mightily to grow under the burdensome weight of a medieval caste system.

Along with bread-and-butter business information are insights into the nature of the people and their mores. (One local manager insists on a different lunch period than that of his subordinates.) It's must reading for U.S. chemical executives appraising Sicily as a site for investment, in fact for anyone doing business in markets served by Sicilian, and Italian, producers.

When DiRaimondo left his desk in Milan to tour Sicily for *CW*, he was returning to his parents' former home. DiRaimondo was born in Milwaukee, Wis., attended Illinois Institute of Technology, where he studied chemistry and chemical engineering. Subsequently, he earned a Ph.D. in Humanities from the University of Chicago. While living in Chicago, he ran a translation bureau.

Like all McGraw-Hill foreign bureau chiefs, DiRaimondo speaks the language of the country in which he works. In addition, he speaks French and Spanish fluently and, of course, English. His wife, Lithuanian by birth, speaks 11 languages. The DiRaimondos have three children.

From all standpoints, Gene DiRaimondo is eminently qualified to write about Italy's burgeoning chemical process industries. In the pages of CHEMICAL WEEK, his sympathetic yet objective insight works for you.

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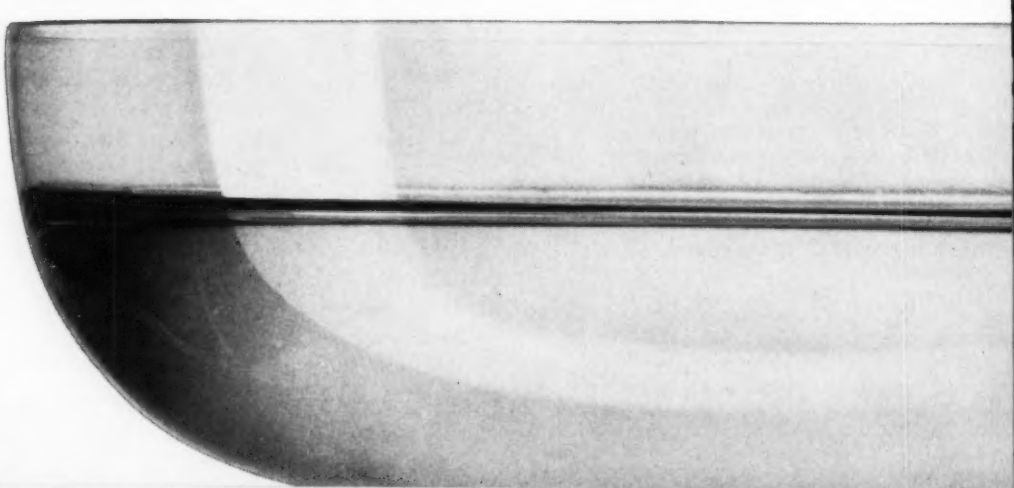

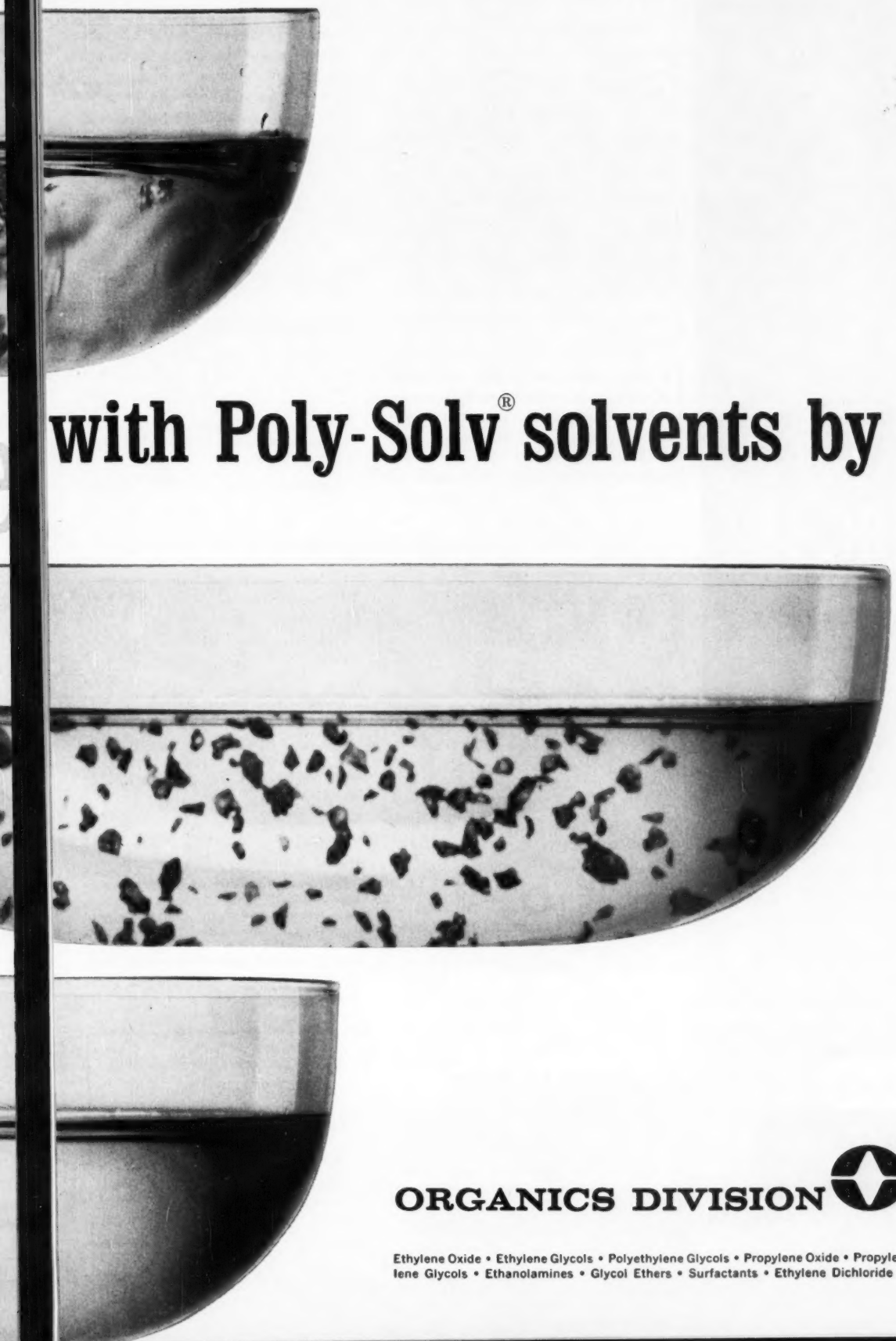

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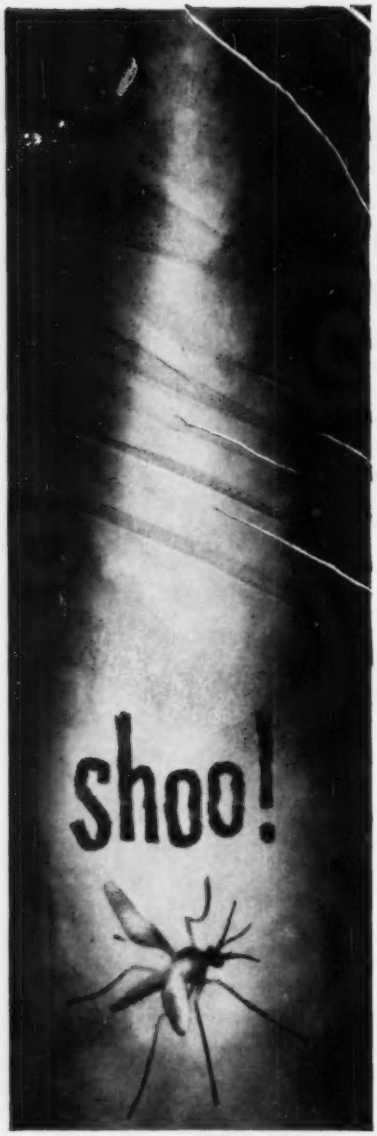

Pesky insects shy away from diethyltoluamide, the most effective insect repellent yet discovered. In developing volume production of this basic ingredient for aerosols, creams and roll-ons, Cowles again increased its capability in organic chemical processing. For new things in chemical know-how, keep your eye on Cowles.

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NEW THINKING

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LETTERS

No Simple Answer

TO THE EDITOR: . . . The crab grass control article (*April 1, p. 63*) is well written, with a notable insight into the problem. As far as I can tell, the article is accurate with but two exceptions. Diphenatrile, to our surprise, is being marketed in this area this year, although it was tested at only two stations in the Northeast last year. Second, chlordane must be applied at 60 lbs. per acre (actually 70-80 lbs. to get good control) of actual ingredient, not 60 lbs. of the 20%-active material. A major drawback of chlordane is its apparent inability to control crab grass consistently.

Although the homeowner would like a simple statement of the best means of crab grass control, whether chemical or cultural, there is no simple answer. The type of article you have written should indeed be read by more homeowners. It might help them to realize that, despite the advertising claims, it is not yet true that any one method or material is outstanding in effectiveness. . . .

JOHN F. AHRENS
Connecticut Agricultural Experiment Station
New Haven, Conn.

Eighth, Not Eight

TO THE EDITOR: You published an article titled "Lined Valves Pass Tests in Plant Service" (*April 15, p. 99*). In comparing plastic-lined valves with glass-lined valves this statement was made: "Glass has another limitation: it can't be used on curves with less than 8-in. radii—ruling out small sizes."

Might not the 8-in. valve have been a misprint? Actually, the Pfaudler Co. has successfully applied glass to metal on radii as small as ⅛ in.

DONALD C. DEYLE
The Pfaudler Co.
Rochester, N. Y.

Columbium by August

TO THE EDITOR: May we congratulate you on your special report "Columbium/Tantalum" (*May 6, p. 87*). However, you erroneously report (*p. 94*) St. Lawrence Columbium and Metals Corp. as planning to start production in August "producing 500 tons of concentrate containing 4.5-5% of columbium pentoxide daily." Indeed, our company is well advanced with its plant and we expect to start producing in August. At first, we will mine by open-pit operation some 500 t/d. of ore, which we will concentrate into 4 t/d. of concentrate assaying between 50-55% columbium pentoxide (Cb_2O_5). . . .

RICHARD STAINES
Secretary-Treasurer
St. Lawrence Columbium and Metals Corp.
Montreal

MEETINGS

Gordon Research Conferences, June 19-23; Colby Junior College, New London, N.H.—catalysis; New Hampton School, New Hampton, N.H.—chemistry and physics of liquids; Kimball Union Academy, Meriden, N.H.—cell structure and metabolism.

American Society of Pharmacognosy, annual meeting, University of Houston, Houston, Tex., June 19-21.

Fifth biennial carbon conference; cosponsors: Pennsylvania State University and American Carbon Committee; Pennsylvania State University, University Park, Pa., June 19-23.

American Assn. of Cost Engineers, annual meeting, Somerset Hotel, Boston, June 21-23.

Parenteral Drug Assn., Inc., Warwick Hotel, Philadelphia, June 23.

American Society for Testing Materials, 64th annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 25-30.

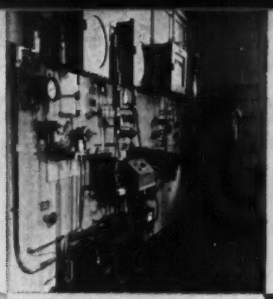
Instrument Society of America, automatic-control conference, Penn Sheraton Hotel, Pittsburgh, Pa., June 28.

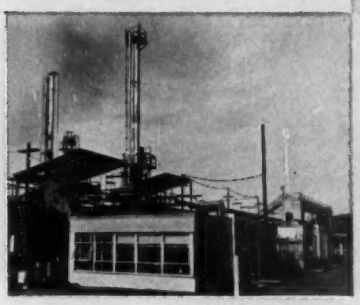
Instrument Society of America, second joint automatic control conference, University of Colorado, Boulder, Colo., June 28-30.

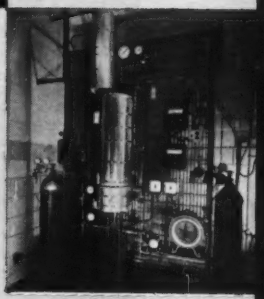
18th International Congress of Pure and Applied Chemistry, Montreal, Can., Aug. 6-12.

CW welcomes expressions of opinion from readers. The only requirements that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.







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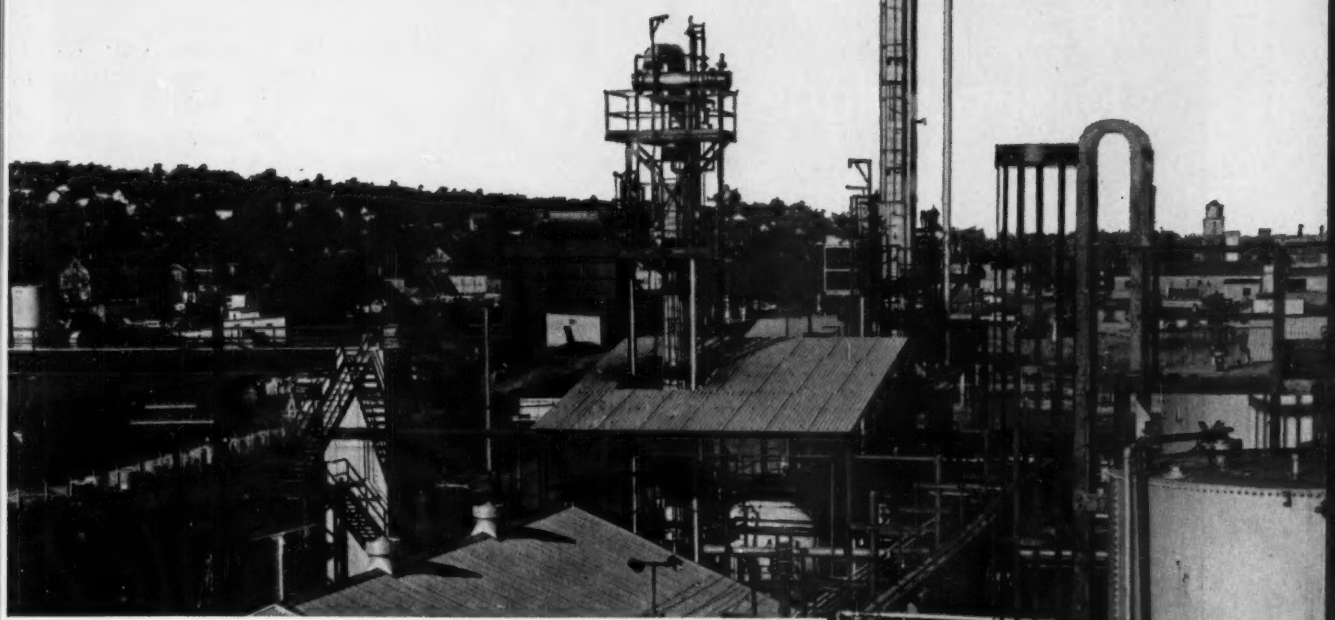

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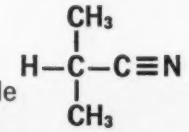
3 NITRILES

...now available in commercial quantities

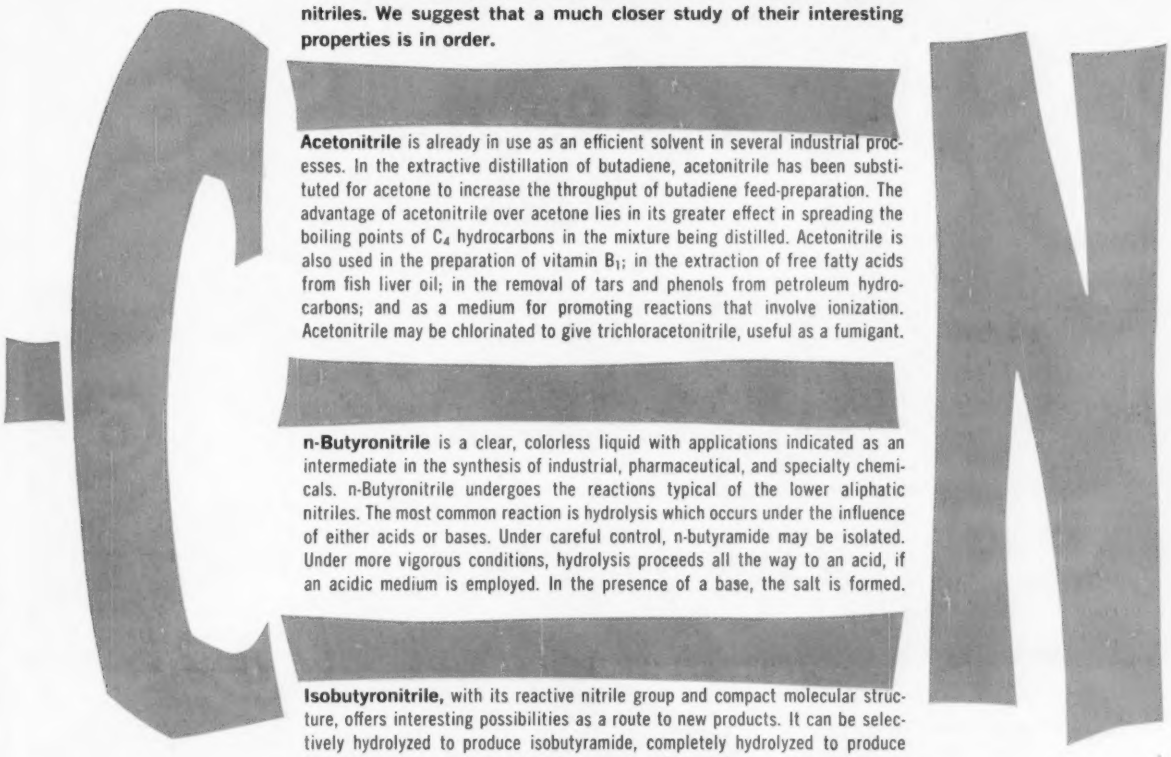
Acetonitrile $CH_3C \equiv N$

n-Butyronitrile $CH_3CH_2CH_2C \equiv N$

Isobutyronitrile



To the best of our knowledge, these aliphatic nitriles have heretofore been available only on a limited basis. And, because of their limited availability, they have rarely been evaluated as commercial processing materials for large scale operations. Now comes Eastman with a new and unique process for the manufacture of these aliphatic nitriles. We suggest that a much closer study of their interesting properties is in order.



Acetonitrile is already in use as an efficient solvent in several industrial processes. In the extractive distillation of butadiene, acetonitrile has been substituted for acetone to increase the throughput of butadiene feed-preparation. The advantage of acetonitrile over acetone lies in its greater effect in spreading the boiling points of C_4 hydrocarbons in the mixture being distilled. Acetonitrile is also used in the preparation of vitamin B_1; in the extraction of free fatty acids from fish liver oil; in the removal of tars and phenols from petroleum hydrocarbons; and as a medium for promoting reactions that involve ionization. Acetonitrile may be chlorinated to give trichloracetonitrile, useful as a fumigant.

n-Butyronitrile is a clear, colorless liquid with applications indicated as an intermediate in the synthesis of industrial, pharmaceutical, and specialty chemicals. n-Butyronitrile undergoes the reactions typical of the lower aliphatic nitriles. The most common reaction is hydrolysis which occurs under the influence of either acids or bases. Under careful control, n-butyramide may be isolated. Under more vigorous conditions, hydrolysis proceeds all the way to an acid, if an acidic medium is employed. In the presence of a base, the salt is formed.

Isobutyronitrile, with its reactive nitrile group and compact molecular structure, offers interesting possibilities as a route to new products. It can be selectively hydrolyzed to produce isobutyramide, completely hydrolyzed to produce isobutyric acid, or hydrolyzed in the presence of alcohols to produce the corresponding isobutyrate ester. In the presence of excess ammonia, isobutyronitrile is catalytically reduced to mono- and diisobutylamines. It has been converted to methacrylonitrile by vapor-phase oxidation over catalysts such as activated vanadium oxide on a neutral carrier. Yields as high as 65% have been reported. Isobutyronitrile reacts with primary alcohols and hydrogen chloride to form the imidoether. Reduction of isobutyronitrile with polyhydric phenols forms corresponding isobutyryl derivatives. Ketones may be formed by hydrolysis of the magnesium salt of a ketoimide, produced by the addition of an alkylmagnesium salt to isobutyronitrile.

Physical properties and latest specifications for these Eastman nitriles are obtainable on request. For more information and suggested applications, call your nearest Eastman representative, or write to us at Kingsport, Tennessee.

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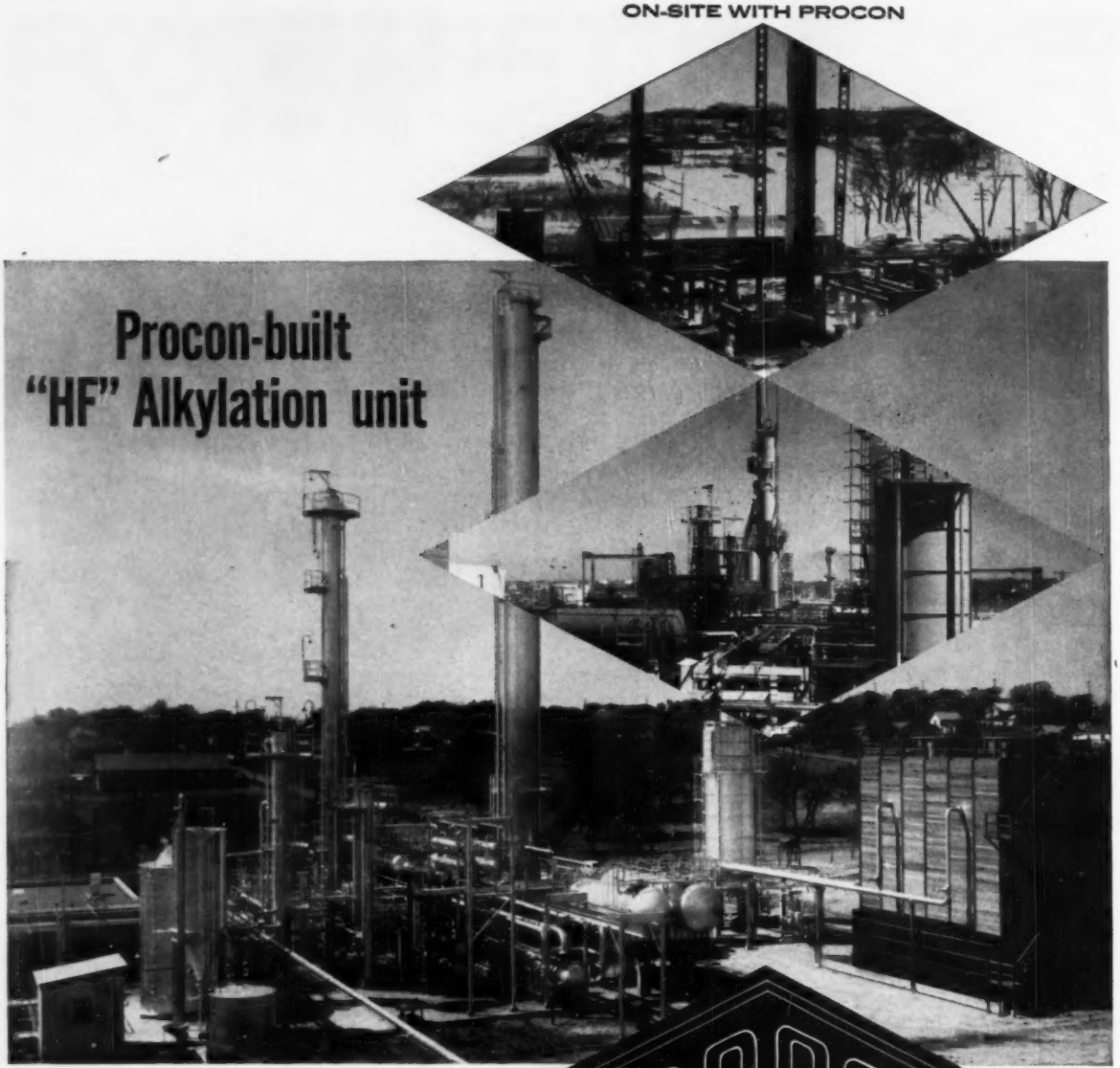

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Maintaining schedule during the construction of a processing unit requires the precise co-ordination and timing of a series of design, engineering, procurement and construction details. But to complete ahead of schedule requires the extras in experience . . . in judgement, that save minutes and days. A right decision . . . a proper procedure . . . a new technique, these are the *experience factors* that help PROCON build better and on time.

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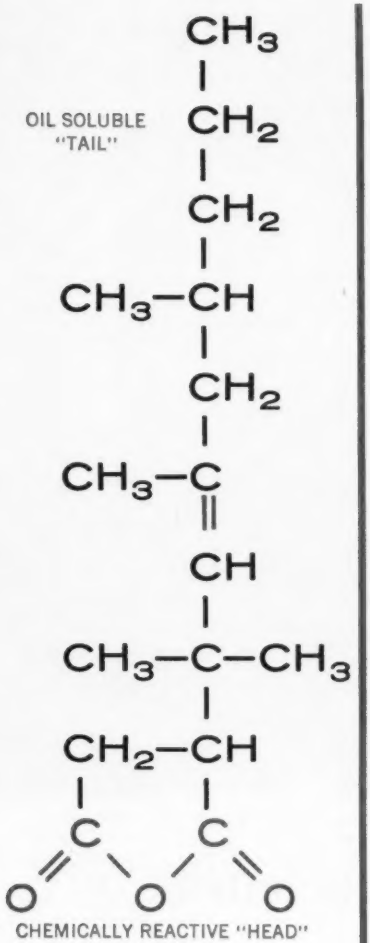
available in commercial quantities—at a new low price



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Monsanto's brand of Tetra-PropenylSuccinic Anhydride—a dodecenylsuccinic anhydride

(Structure shown is suggested as the predominant isomer.)

Monsanto®

1. Epoxy curing agent (also finds application in drying oils and lacquers, waterproofing compounds and polyester resins)
2. Corrosion inhibitor (*per se* and in reaction products with amines, alcohols, peracetic acid)
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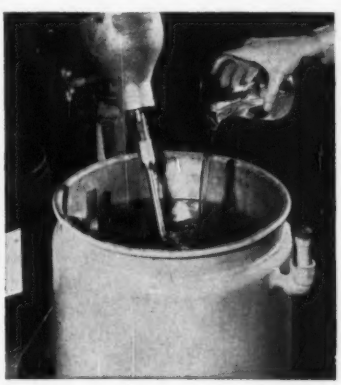

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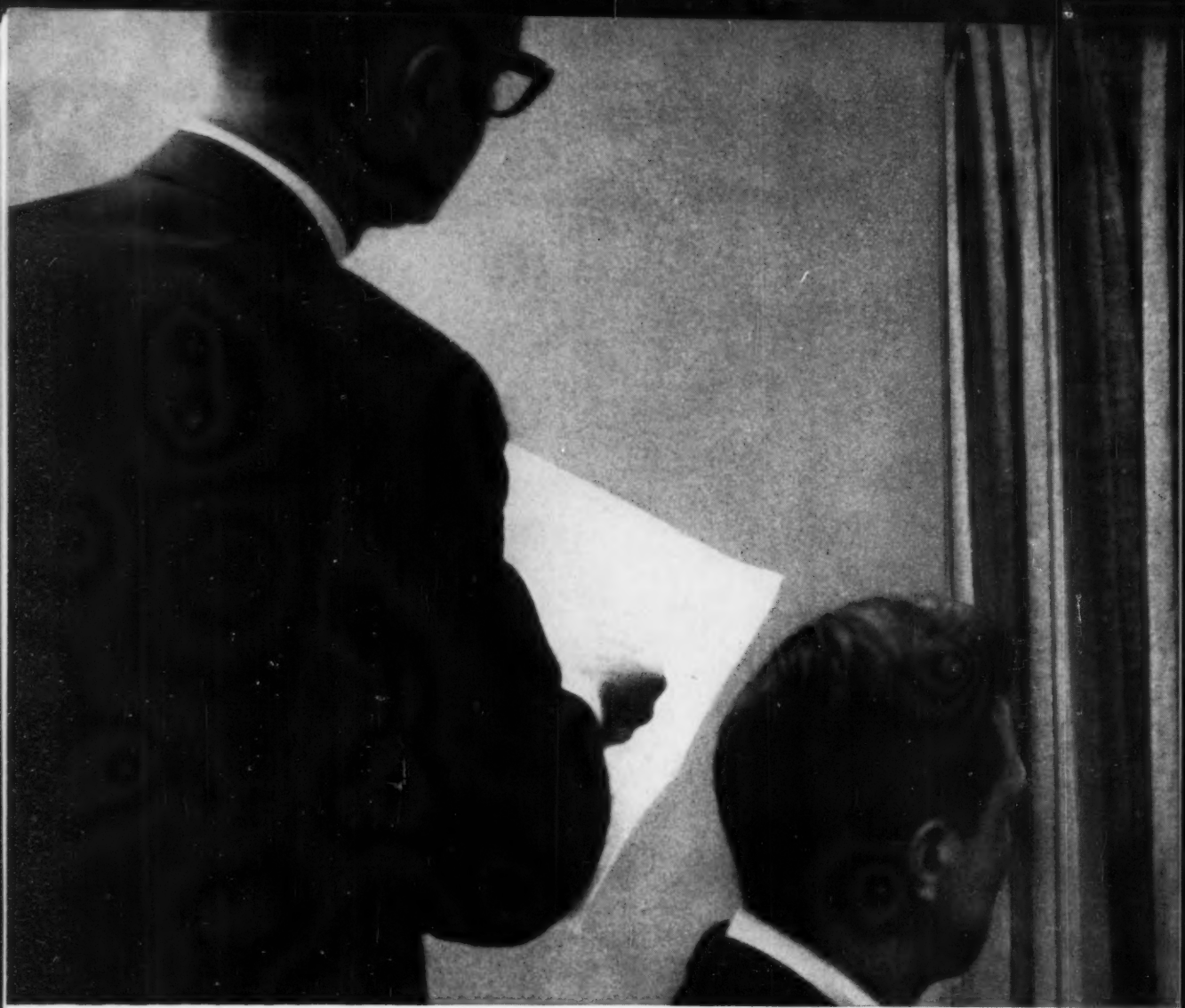


New IBM Inventory Management Simulator

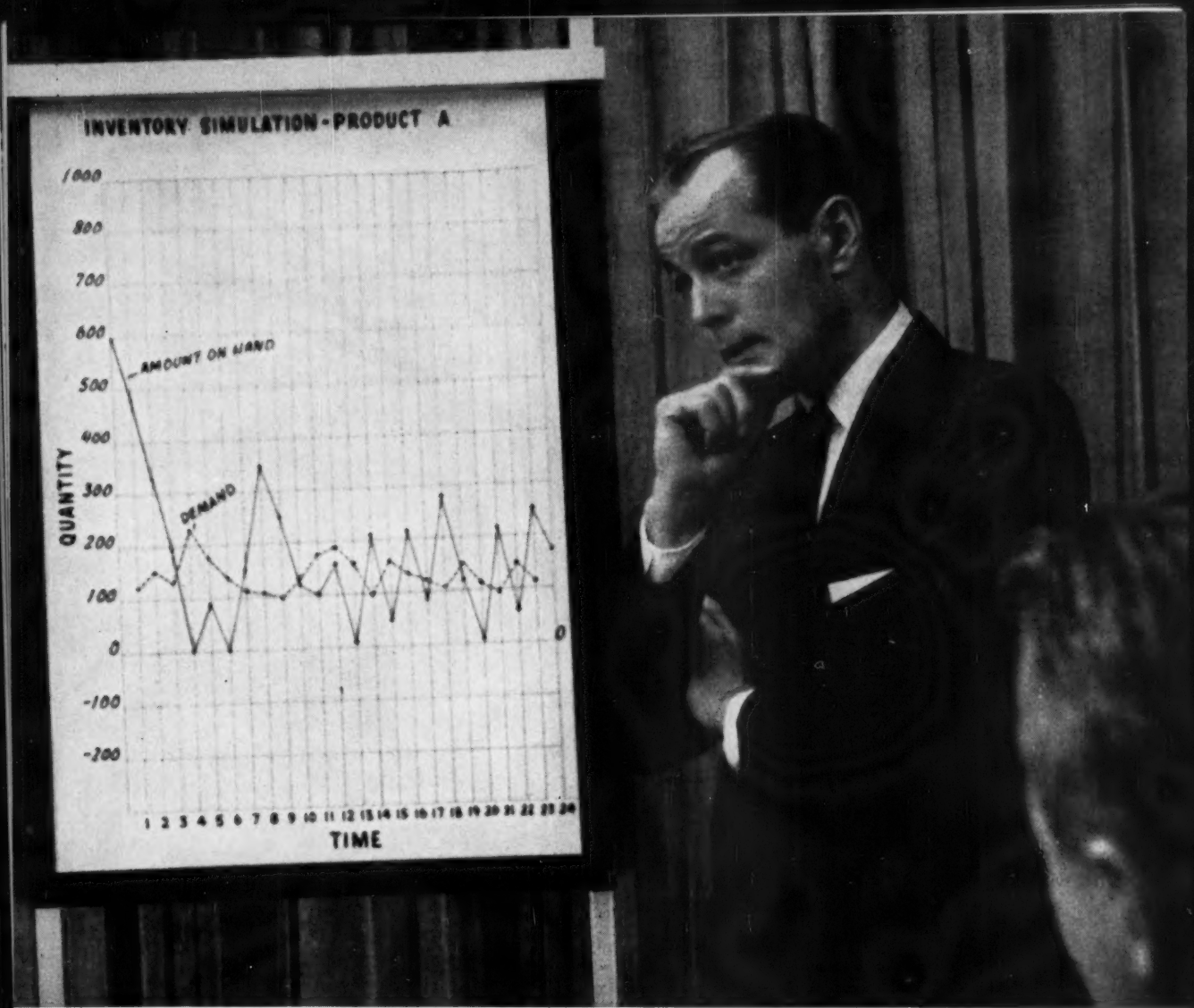
Management pre-tests inventory

How often have you wanted to peer into the future... see the probable results of your inventory policy? **Now you can.** An IBM data processing technique—Inventory Management Simulation—establishes the computer as an invaluable management tool for problem solving and decision making.

This technique lets you test and evaluate alternate plans electronically without disrupting present operations. In effect, it lets you turn *hindsight* into *foresight*.

Simulation is performed by creating within the computer a mathematical model of an inventory control system. Then the model is subjected to various demand situations. In every case, the computer reports what would have happened had this particular system been used to handle each situation. Of course, both the model and the demand factors can be endlessly varied.

Here's the important thing: Through simulation, the trial-and-error method of determining a course of action is performed within the computer—not during the course of your firm's business. This gives you a fast way to test plans under a wide range of conditions before actually putting them



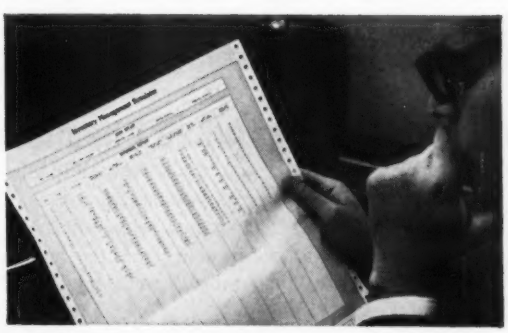
LOOKING AHEAD. Management has run a computer simulation of a proposed inventory plan. Company executives (above) now examine charted results showing how the plan might work, what problems might arise, where improvement might be sought. Print-out sheet (below) from an IBM computer contains facts needed to judge long-range results of a given inventory control plan. Inventory Management Simulation takes much of the guesswork out of planning.

decisions with electronic speed

to use. Unprofitable or inadequate courses of action show up in advance. You avoid them. And you select with confidence the system best suited to your firm's objectives.

Getting started. If you are an IBM customer, you can take advantage of the Inventory Management Simulation Program at once. IBM helps you collect the facts you need... and helps you set up a computer program to analyze them.

Ask your IBM representative to show you how this new technique can uncover *your* most effective inventory policy.



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For specs and local offices, see Chem. Materials Catalog, page 272A; Chem. Week Buyer's Guide, page 27. 2819

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Business
Newsletter

CHEMICAL WEEK
June 17, 1961

The industry is off on another capacity-building spree. Surprisingly, late-comers continue to elbow into fields already expected to be overcrowded with potential producers. Benzene (*see p. 91*) is a good example.

Latest industry stunner is a phthalic anhydride venture planned by Union Carbide. The company, currently a major phthalic buyer, will build a 50-million-lbs./year, Badger-designed and-engineered fluid-bed unit at Institute, W. Va. Target date for "full operation": late '62.

Feedstock for the plant will be petroleum-naphthalene for which Carbide is now shopping around.

Initially, a portion of the new phthalic production will supply a near-by FMC plasticizer plant. But eventually the entire output will be used captively for Carbide's own line of Flexol plasticizers.

Capacity for the latter will be gradually increased some 40% this year. Although size of the operation has never been revealed, the expansions should boost Carbide's plasticizer-making potential to about 120 million lbs./year.

•

Even more intriguing than the Carbide phthalic move are trade reports concerning other petro-naphthalene activities. Word is that a number of companies, reportedly considering petro-naphthalene production, are also scouting for possible phthalic outlets.

Some phthalic buyers reportedly have been offered long-range, large-quantity phthalic deals, with price hitched to costs of naphthalene.

Progress report on Ashland Oil's petro-naphthalene. The new installation (at Catlettsburg, Ky.), which was shut down for a couple of days recently, is now perking along at a 60-million-lbs./year rate. The company hopes to hit full capacity production (over 80 million lbs./year) soon—it will have to, to quiet clamoring customers.

•

Details are now available on a couple of Borden Chemical projects hinted at earlier this year (*CW, Feb. 4, p. 24*). Vinyl acetate and methanol plants, to be wholly owned by Bordens, will be built adjacent to planned Monochem facilities at Geismar, La. (Monochem is jointly owned by Borden and U.S. Rubber; it will produce vinyl chloride monomer and acetylene).

The methanol plant will cost about $15 million, have a 25-million-gal./year capacity, and should be in operation by May '62. The vinyl acetate unit, due in later in '62, will set Borden back about $5 million, be able to turn out some 50 million lbs./year of monomer. Both will be built by United Engineers and Constructors of Philadelphia.

It's a cross-integrated operation. Borden will utilize off-gas from Monochem's upcoming acetylene production for its methanol, and take about 15 million lbs. of acetylene (out of a total of 80 million) for its vinyl acetate. The other 63 million lbs. of acetylene capacity will go for Monochem's 150-million-lbs./year vinyl chloride monomer plant.

Morton Chemical early this week confirmed reports that it would produce anhydrous hydrogen chloride for Monochem's vinyl chloride operation. Long-term contracts have been signed with Borden and U.S. Rubber.

The Morton plant, situated at Geismar, should be ready early next year. Morton is also considering production of other chemicals at the site.

•

A stock fight may be brewing for control of Chemical Process Co. (Redwood City, Calif.). Monday (June 12) Commercial Solvents offered to buy 200,000 shares of CP stock at $15/share net (offer expires June 23). Chemical Process is the company whose board agreed on a merger with Diamond Alkali last month (*CW Business Newsletter, May 27*) and whose shareholders will vote on that proposal Aug. 15.

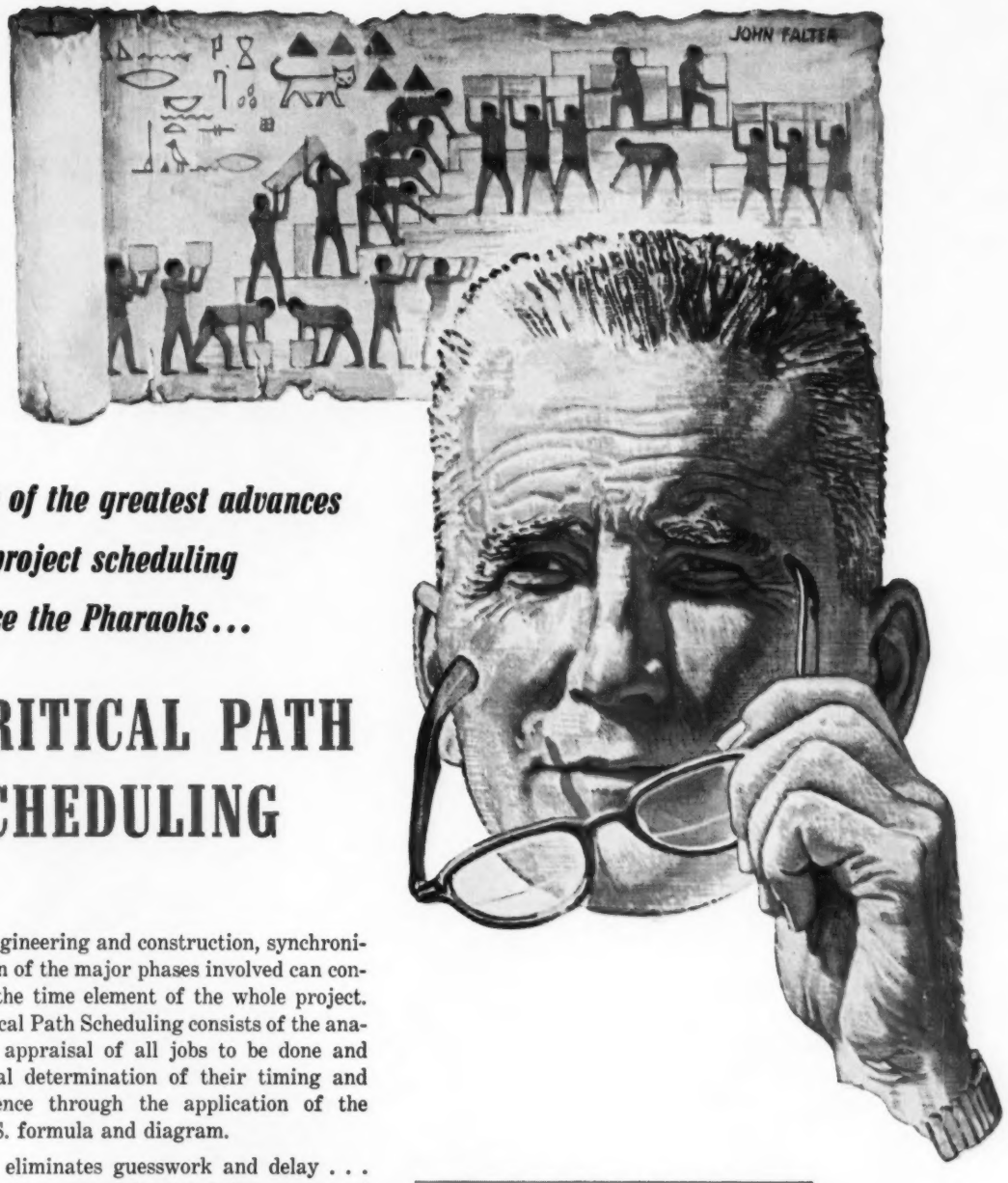
Commercial Solvents had been dickering on a stock exchange-merger deal with Chemical Process; it made its last offer May 1, when it was notified of the Diamond proposition. CSC which is already a "substantial" stockholder in the California company, professes no intention of getting into a fight with anyone, says it merely wants to acquire more shares "to be in a position to do something."

Diamond Alkali is standing pat. Its chairman and president, Raymond Evans, tells *CW* that Diamond thinks its offer is better than Commercial Solvents' and is "considering what moves to make."

In San Francisco, CP President Alexis Post indicates his directors still favor the Diamond Alkali proposal over the earlier CSC stock exchange merger offer, but stockholders are free to sell. The company has not yet decided whether to make any recommendation to its shareholders.

•

On the international scene: Common Market speedup plans (*CW, June 3, p. 23*) may fall through. France will scotch them if progress isn't made on agricultural problems. This week's EEC ministers' meeting could bring a showdown within the Six . . . U.S. chemical exports to Australia, booming since import restrictions were dropped, may be crimped again. New emergency tariffs may be imposed on short notice within the next 12 months . . . The Indian government has approved Stanvac's proposed ethylene-butadiene-aromatics plant for a Bombay refinery . . . Von Kohorn will supply Japan's Nippon Rayon with nylon-6 tire-cord machinery and technology.



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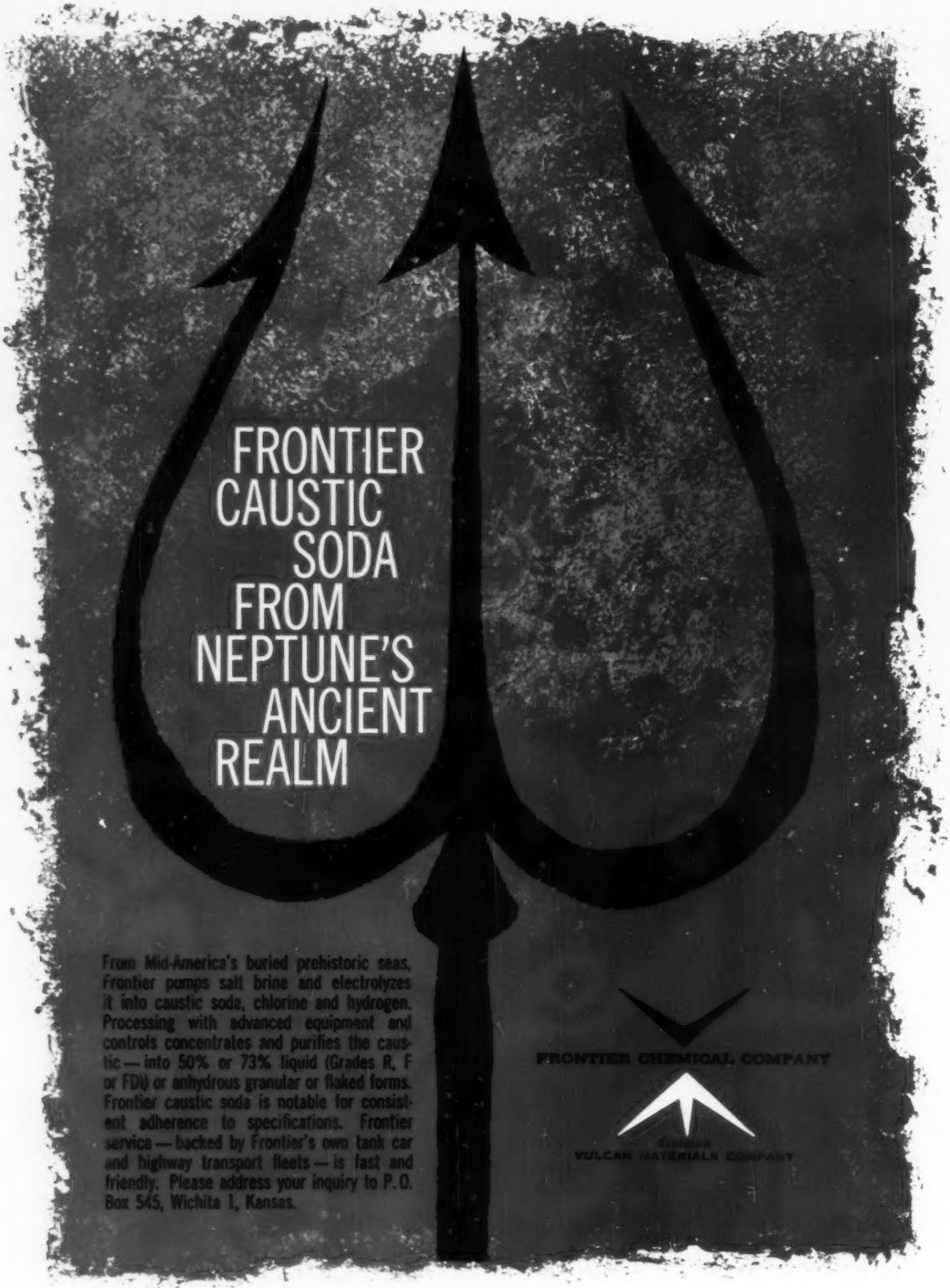
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Methyl Isoamyl Ketone—new slow-evaporating vinyl solvent with unusual solvent power.

Isophorone—standby for baked vinyl solution coatings; slowest evaporating of the line.

The table below lists viscosities measured on a Brookfield viscometer at 20 R.P.M. and 68°F., and relative evaporation rates (n-Butyl Acetate = 100) for these five ketones:

	Brookfield Viscosities of Lacquers at 68° F. (centipoises)		Relative Evaporation Rate
	Formula A	**Formula B**	
Acetone	94	88	1160
Methyl Ethyl Ketone	86	130	572
Methyl Isobutyl Ketone	230	360	165
Methyl Isoamyl Ketone	304	504	45
Isophorone	930	434	3

Formulas (Parts by weight)

	A	B
BAKELITE Vinyl Resin VYHH	20	20
Ketone	80	40
Xylene	—	20
Toluene	—	20
Total	100	100

For complete information on ketones or other solvents, including esters, alcohols, and glycol-ethers, call your CARBIDE Technical Representative, or write: Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y.

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UNION CARBIDE CHEMICALS

Chemical Week / JUNE 17, 1961

Show Time —Time for Business

Carrying give-away plastic baubles ranging from footballs to shot-glasses, attendees at the Ninth National Plastics Exposition trooped back to their home bases this week convinced that equipment makers have been more inventive over the past year than resin producers. The show—which covered three floors of New York's Coliseum, ran all last week, and drew 36,850 people—gave the highly diverse plastics industries a rare brief interlude of "togetherness."

The biggest attraction for most plastic fabricators was the new machinery, largely from Europe. Unlike past shows, which saw few equipment changes, this one featured a number of faster-molding items—new screw-type injection molders, in particular. Many fabricators for the first time held off buying new equipment until examining "what they had at the show."

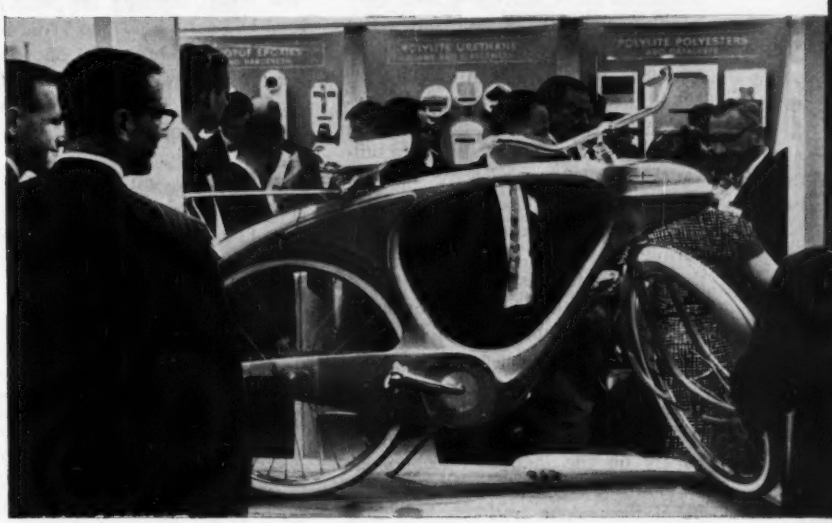
Resin makers, who largely exhibited modifications of established materials, benefited from the attentive crowds drawn by the new equipment. One coated-fabrics maker, for example, who found little in his line displayed ("Everybody thinks that plastics is all extrusion"), nevertheless found the show well worth his time. "I got to meet some company people besides the one salesman I deal with. It gave me some different slants."

Most exhibitors agreed that the people who came were more serious-minded than usual. "This year we have to be," one molder declared, alluding to the rise in competitive pressure. Attendees didn't have to have their technical data sugar-coated with entertainment, were actively seeking it out.

Idle curiosity-seekers were to a large measure screened out by a $2 admission charge—the first year the

C W PHOTOS—JOAN SYDLOW

Intent molder concentrates on learning more than competitors about new item.



New plastic products, such as bicycle, intrigued expansion-minded fabricators.

Drawing biggest crowds were new molding machines and free toys they made.

show wasn't free. Long lines formed at Eastman's exhibit, where gift plastic cocktail shakers were dispensed as fast as they could be made, and at other give-away exhibits (mainly equipment makers demonstrating their machines). Most of the gift seekers were wives and families of industry men. But enough of the plastics executives themselves (the show's attendance was mainly on the management level) lined up for cheap footballs and wash basins to prompt remarks about $25,000/year executives travelling half-way across the country on an expense account to spend half an hour waiting for a free 25¢ toy. Some demonstrators of molding machines (costing up to $350,000) dispersed bargain-basement crowds of housewives by stopping the give-away of samples.

One major resin maker stated privately that its management feels the show is getting too big, and is considering not coming in next time: "It's got to the point where you must have a 40-man booth or get out." But most were well pleased with the amount and quality of inquiries, found the show well-managed. Several were particularly pleased with new rules that allow exhibitors to utilize their full floor space for displays, rather than only the back third, as had previously been allowed. This permitted several high-traffic, flow-through layouts, such as those of Eastman, Allied, Du Pont, Spencer, Monsanto, Hercules, Union Carbide.

While the show got down to specifics, the Society of the Plastics Industry's Annual Conference, at the Commodore Hotel across town, heard papers on the industry's technological and marketing prospects. Here, in panel discussions, resin makers and resin buyers confronted each other. A major over-all conclusion, reinforced by the multitude of exhibits viewed at the Coliseum: plastics are confusing to buyers. There are too many resins to remember, too many trade names, not enough classification and dependable data.

Particularly at sea over the multiplicity of plastics are people in the potentially largest markets: construction and transportation. Enlightening those prospective customers could well be a major goal for the next plastics show, tentatively set for fall of '63 in some Midwestern city.

Cutting Back, But Slightly

Despite the upturn in business, management men—in chemical processing and in most other industries—have been trimming their capital spending plans for this year. But the cutbacks are slight and of doubtful import.

Among the reductions that have taken place since January, even though the sales pace has been picking up month by month:

- About Feb. 1 producers of chemicals and allied products indicated (in the quarterly survey conducted by the U.S. Dept. of Commerce and the Securities & Exchange Commission) that they planned to expend a total of $1.73 billion for new plant and equipment this year. By May 1 (according to the government's new report out late last week) that total had shrunk 6%, to $1.62 billion.
- For all branches of the CPI the '61 total was projected as of Feb. 1 at about $6.34 billion; three months later, this projection was down 4%, to $6.07 billion.
- Similarly, estimated '61 capital spending by all manufacturing industries Feb. 1 was about $14.11 billion; by May 1 it had dwindled 1%, to $14 billion.

Because capital spending usually increases when business is improving, and because capital spending itself is a major factor in the economy, those downward revisions of the earlier plans for '61 caused stock prices to dip last week.

But viewed in perspective, the more conservative spending plans appear to have very little "bearish" significance. For one thing, the cutbacks are relatively small. It's logical to assume that for the most part they represent deferral of projects that either are of doubtful profitability or would unnecessarily increase plant production capacity.

Over-all, this year's capital spending is firming up at a rate that now seems likely to be within 3% of last year's total—which was the second highest on record. In some industries —chemicals and allied products, for example—'61 capital outlays are expected to exceed last year's.

Furthermore, management appears to be in a mood to reverse the slight downward trend in chemical capital budgeting.

Producers of chemicals and allied products, for instance, were investing at an annual rate (seasonally adjusted) of $1.5 billion during the first quarter of this year; they stepped up their spending rate to $1.6 billion in the second quarter and now expect their rate to be at least $1.65 billion during the rest of the year.

Easing Off on Capital Spending

(Actual and estimated expenditures for new plant and equipment, in billion dollars. Sources: U. S. Dept. of Commerce, Securities & Exchange Commission.)

Industry Category	*'60 Actual*	*'61 Est. in Feb.*	*'61 Est. in April*	*First qtr.*	*Second qtr.*	*Third qtr.*
Chemical process industries:						
Chemicals and allied products	1.60	1.73	**1.62**	0.33	0.41	0.41
Products of petroleum and coal	2.64	2.83	**2.71**	0.56	0.68	0.68
Rubber products	0.23	0.24	**0.23**	0.05	0.05	0.06
Pulp, paper and allied products	0.75	0.69	**0.73**	0.16	0.19	0.19
Primary non-ferrous metals	0.31	0.31	**0.27**	0.07	0.07	0.06
Products of stone, clay and glass	0.62	0.54	**0.51**	0.11	0.13	0.12
CPI totals	**6.15**	**6.34**	**6.07**	**1.28**	**1.53**	**1.52**
All manufacturing	14.48	14.11	**14.00**	3.00	3.51	3.48

Carbide's Bunn, Wyandotte's Semple: Heading MCA for 1961-62.

New Challenges for MCA

This week the Manufacturing Chemists' Assn. is back on the job at its Washington headquarters after the annual two-day meeting and outing last weekend at White Sulphur Springs, W. Va. And it has brought back a tough set of assignments: boosting the chemical industry's cause on a dozen or more fronts, including taxation, industrial relations, shipping, labeling and education, to name only a few.

Typically, most of these actions concern the lengthening list of laws and regulations that apply to the industry. Governmental relations have long been MCA's primary function (*CW, Dec. 20, '58, p. 68*). Its continuing growth in size, activity and importance stems from the ever-increasing laws and regulations affecting the industry that are being proposed, adopted, amended and enforced.

In the fiscal year just ended, for example, the association's regular operating budget increased 14.9%, to $896,035—not including outlays totaling some $250,000 for the education and plastics programs, both of which have been separately financed through voluntary subscriptions. With an avowedly "activist" Administration in the White House, it's more than likely that MCA's workload and its budget will both continue to rise during the next four years.

Bunn Takes the Helm: In last week's annual meeting—the 89th since the association's founding—Union Carbide Corp.'s Howard Bunn was elected chairman of MCA's board of directors for the coming year. He is to succeed Shell Chemical's Richard McCurdy. Wyandotte's Robert Semple was elected chairman of the executive committee, and Allied Chemical's Kerby Fisk and Canadian Industries Ltd.'s Peter Allen were named vice-presidents.

Re-elected as full-time staff officers: General John E. Hull, president, and Maurice Crass, Jr., secretary-treasurer.

Eleven executives of member companies were elected as new members of MCA's board of directors: Robert Huntley, Cowles Chemical; David Dawson, Du Pont; W. Kenneth Menke, Pittsburgh Chemical; Joseph Neubauer, Pittsburgh Plate Glass; John Wood III, Enjay Chemical; John Hill, Air Reduction; Walter Remmers, Pittsburgh Metallurgical; Phillip Dinkins, General Aniline & Film; Kenneth Klipstein, American Cyanamid; Raymond Evans, Diamond Alkali; and Harold Martin, Metal & Thermit.

Speaking Up for Industry: MCA was able to report numerous achievements in the legislative arenas during the past year—such as adoption by Congress of two MCA recommendations in the new law concerning transportation of radioactive materials and etiologic agents. Currently a number of MCA's 27 functional or technical committees are speaking up for the industry before various legislative committees and executive agencies this month.

Just last week a member of MCA's Tax Policy Committee testified in Washington in opposition to certain proposals on taxation of foreign income (*p. 27*). Testimony is now being prepared on proposals for investment incentive tax credit, withholding of taxes on dividend and interest payments, and deductibility of travel expenses.

Other committees are keeping busy, too. One is keeping a sharp eye on tariff and trade negotiations under way at Geneva; another is preparing a proposed revision of certain safety and health standards under the Walsh-Healey law, building up arguments against proposed regulations under the new law on labeling of hazardous substances. It's also studying possible savings in shipping of chemical products through greater use of plastics and other innovations in bag packaging.

Education Program to Continue: Two new subcommittees, one on chemical propellant safety and the other on physical distribution of chemical products, now are expected to advance toward full committee status.

Completing its five-year task last month was the Education Advisory Committee, which had been set up in '55—two years before Russia's first Sputnik sparked widespread concern about shortcomings in science education in the U.S. But instead of being disbanded, that committee is being renamed the Education Activities Committee and is being commissioned to continue its program permanently.

Costs will be somewhat reduced, but the aim remains the same: to foster the teaching and learning of chemistry. The program's accomplishments include a new approach to laboratory experiments, a new concept in educational films, use of experiments throughout elementary levels, and providing recognition and encouragement for chemistry instructors. And these gains are felt to far outweigh

the five-year, $800,000 cost of the program (which is 20% less than the sum budgeted for this period).

Unwavering Support: MCA praises its member companies' steady support for the education program, says that "at no time—even during the '58 recession—was the committee hampered by worries as to whether the industry would continue its support."

Originally, the cost to member companies voluntarily backing the program was 33% of their regular MCA dues. This was reduced gradually, and last year went down to 22% of annual dues. In the future the cost will be somewhat less.

William E. Chace, staff director of the program, says the future will see "even greater emphasis on brains and originality, and less on mass distribution of materials." Finding "novel, exciting, useful teaching methods that others can copy" will remain the chief function of the program, he adds.

No Time to Quit: This activity, Chace says, is the sort that industry is uniquely equipped to make.

MCA's board of directors has decided that to drop the education program now "would be akin to the folly of entrepreneurs who, having developed a product, constructed a plant and built up a market, then abandoned the project."

In his report to the membership, General Hull called on top management to guard against malpractices. His prime example of what to avoid: the price fixing for which various companies and individuals in the electrical equipment industry were recently sentenced.

"The reputation of modern business management has been badly damaged and it will take imagination and vigor, as well as character, to repair the damage," he declared. "Top management will be expected to know what is going on in their organizations. It will be expected to show that methods do exist or can be devised for the effective control of even the largest corporations."

Attendance—again limited by the space available at the resort—was about 825, with representation from 165 of MCA's 193 member companies. Guest speaker at Friday night's banquet was Secretary of Commerce Luther Hodges, who said the industry could benefit from the proposed investment incentive plan.

Balance of Foreign Payments for 19 Companies

(Data from 19 U.S. companies, in millions of dollars)

	1957	1960
OUTFLOW		
Capital Outflow	24.4	61.3
Imports of finished goods from foreign subsidiaries	3.5	3.9
Total Outflow	**27.9**	**65.2**
INFLOW		
Remitted common stock dividends	64.8	81.2
Royalties and licenses	8.0	11.4
Management	14.8	18.6
Other services and fees	3.3	5.4
Sales of capital equipment and material for further processing . . .		
By parent companies	102.9	128.6
By other U.S. companies	53.9	65.4
Exports* to foreign subsidiaries for resale		
From U.S. parent	183.2	210.3
From other U.S. companies	19.0	18.9
Other exports attributed to direct foreign investments	152.3	171.9
Total Inflow	**602.2**	**711.7**
NET INFLOW	**574.3**	**646.5**

*Includes some unsegregated materials for further processing.

Tax Proposals Under Fire

During five days of hearings before the House Ways and Means Committee last week, spokesmen for a dozen chemical process companies presented their case against the Kennedy Administration's proposals for changing tax laws on overseas business.

The Administration's main purpose is to change the law as it affects earnings of U.S. subsidiaries in "developed" countries, on the theory that investment in these countries creates an unjustified outflow of payments. The most important feature of the Kennedy recommendation would eliminate the deferral privilege under which U.S. taxes don't have to be paid on foreign subsidiary earnings until they are remitted to the U.S. as dividends. (*CW, May 20, p. 79*).

The spokesmen for the CPI firms generally denied the entire reasoning on which the Administration's case is based, asserting that—far from hurting the U.S. trade balance—foreign investment is needed to return more dollars to the U.S. They argued that the Administration had not presented all the relevant data, and that more study is needed.

Among those testifying was Henry Heinz, chairman of the H. J. Heinz Co. He spoke on behalf of 19 companies,* most of them in the chemical process industries.

Detailed Data: The heart of Heinz's presentation was data based on reports from the 19 companies on their overseas business (*table*). In addition to showing the outflow of direct investment capital and the inflow of dividends, it gives details of receipts from management fees and royalties, and data on the foreign subsidiaries' trade with the U.S.

The study shows that in each of

* American Machine & Foundry, Armco International, Cabot Corp., Continental Can, Corn Products, Eastman Kodak, General Electric, Goodyear, Heinz, Merck, Monsanto, Otis Elevator, Pfaudler Permutit, Pfizer, Ritter Co., Taylor Instrument, Texas Butadiene, Procter & Gamble, Union Carbide.

the four years 1957-60, remitted dividends exceeded capital outflow for the group as a whole, although this didn't hold true for every company. The data was presented only for the group as a whole.

Moreover, receipts from exports to the subsidiaries of capital equipment and materials for use in manufacturing abroad exceeded the entire capital outflow of the companies.

The data on exports to foreign subsidiaries for resale is said to demonstrate how foreign investment helps boost exports of products not manufactured overseas. In 1960, the value of such exports totaled more than three times the capital outflow.

Heinz contends that there is no data to support the Administration's argument that U.S. subsidiaries' overseas sales of foreign goods displaces U.S. exports. He says that the companies he represents cite many cases where exports were barred for a variety of reasons.

Investing to Compete: Procter & Gamble Chairman Neil McElroy spelled out the impact of his company's operations on the balance of payments. During the last 10 years, P & G has invested $11 million in foreign operations and returned $47 million in foreign earnings as dividends, while borrowing abroad and reinvesting abroad $67 million. To supply its overseas plants with raw materials and equipment, P & G spent $243 million in the U.S. during this period.

Of P & G's total overseas sales—$2.2 billion—only 7% was manufactured in the U.S. Profitable export of soaps and detergents from the U.S. to many countries—e.g., Great Britain, France, West Germany, Italy—is impossible because of tariffs and import restrictions, he says.

WIDE WORLD

P & G's McElroy: Foreign tax proposals would weaken U.S. position.

If the U.S. had taxed P & G's overseas earnings at the full 52% rate, the amount of its reinvested earnings would have been reduced—in turn cutting dividends and purchases from U.S. companies.

McElroy stressed the years it takes to build a business overseas to the point where dividends can be repatriated. P & G's Canadian investment began in 1915, and the first dividends came in 1939; English operations began in 1930, with first dividends in 1946; Philippines investment began in 1935, dividends in 1939; Cuban investment in 1931, dividends in 1939. This delay in repatriating earnings, he explained, means greater dividends can be paid later, and permits the building of a strong, competitive business.

McElroy pointed out that his company's "worldwide competitor" (Unilever) is owned and based abroad, that the tax proposals would put P & G at a relative disadvantage. "In one Western European country where we are committed to establishing a sizable plant, which is necessary for us to do to compete there, the tax difference now proposed could mean an advantage to this competitor of between $8 and $10 million during the next 10 years," he said.

McElroy defended P & G's organization of a Swiss subsidiary in 1953 as a strategic way to sell in 140 small markets. Since 1953, the Swiss operation has taken 46% of its volume from U.S. plants.

When the hearings closed Friday, virtually all of the more than 50 witnesses who testified had come out in opposition to the President's proposals.

Indications are that the committee will vote out a tax bill—perhaps by the end of the month. But the informed guessing is that the committee won't approve the Administration's recommendations. The committee has for several years been urged to change the tax laws to increase incentives for overseas investment. Members aren't at all convinced that the policy should now be reversed.

Doubling Up on Nylon

Two British nylon producers, which now make only the 6/6-type nylon, are taking major jumps into production of the 6 polymer. Last week they revealed plans to make caprolactam, the monomer for nylon-6. Their total capacity could yield enough monomer to put Britain's nylon-6 production near the output level of its nylon-6/6, the only type it now makes.

Imperial Chemical Industries, which has been dickering for Russian caprolactam technology, has picked up Swiss processes—from Esmer Werke AG./Inventa AG.—for making caprolactam and nylon-6. And Courtaulds Ltd. will build a 10,000-long tons/year caprolactam plant.

The caprolactam from the two new plants could yield about 56 million lbs./year of nylon-6. Britain's nylon-6/6 capacity is about 60 million lbs./year.

Two Barrels: ICI will put up a 15,000-long tons/year caprolactam plant at its Severnside complex and —probably on the same site—a large nylon-6 plant. It hasn't disclosed the cost of the plants, but last summer it said it would spend about $28 million to boost nylon output. Most of this will likely go into the two plants. Construction will start shortly, with first output slated for early '63.

Part of the caprolactam will be for general sale, ICI says. Most of that which ICI uses captively will help the company strengthen its position in molding resins, but some of the monomer will probably wind up as fiber. A substantial part of ICI's nylon production is believed to be earmarked for the Common Market.

Toluene Process: Courtaulds' plant will use the toluene process it acquired last year from its associated company, Snia Viscosa (Milan). It's claimed to be the most economic route. Courtaulds will probably supply toluene from its Spondon petrochemical plant, due onstream by August.

Construction of Courtauld's plant is expected to get under way soon after the company finds a site. Although the firm is keeping its marketing plans quiet, it's a good bet that at least part of the output will be used for nylon-6 fiber production by British Nylon Spinners Ltd., which Courtaulds owns jointly with ICI.

national roundup

Rounding out the week's domestic news.

Companies

Standard Oil Co. of California and Standard Oil Co. (Kentucky) have agreed on merger terms that call for an issue of new voting cumulative convertible preferred stock of the California company with an annual dividend rate of $3.30/share. Stockholders of the Kentucky company will receive one new preferred share for each share of Kentucky common. The preferred will be convertible at any time in the ratio of one share of preferred for each 1¼ shares of common stock in Standard of California.

Ralph M. Parsons Co. (Los Angeles) has purchased Anaconda-Jurden Associates (New York), engineering and industrial design subsidiary of Anaconda Co. (New York), for an undisclosed amount. The new company, Parsons-Jurden Corp., will be headquartered in New York and will expand to include engineering and construction of nuclear, missile, petroleum refinery and chemical plants. Personnel from Parsons' Los Angeles main office will transfer to New York.

Consolidated Electronic Industries Corp. (New York) has carried out its proposed acquisition of Thompson-Hayward Chemical Co. (Kansas City, Mo.). CEI gave 225,000 shares of common stock (*CW, March 11, p. 22*), valued at close to $9.3 million, to take over the big agricultural and feed supplement distributor.

Expansion

Rubber: B. F. Goodrich Co. (New York) has a $2-million expansion and modernization program under way at its Akron, O., tire plant. This project, part of a $10-million program started in '60, will expand facilities for making airplane and off-the-highway tires. It's due for completion before year's end.

Sulfite Pulp: Inland Empire Paper Co. (Millwood, Wash.) is adding a 50-tons/day pulp-bleaching plant to its facilities at Millwood, Wash., near Spokane. The new units—three bleaching towers and one storage tower—are due onstream in September.

Fertilizer: Hercules Powder Co. (Wilmington, Del.) is constructing two additional agricultural chemicals units at its ammonia plant in Louisiana, Mo., One will make ammonium nitrate solution (capacity: 50,000 tons/year); the other, ammoniated ammonium nitrate (capacity: 40,000 tons/year). Completion is scheduled for summer of '62.

Diallyl Phthalate: Rogers Corp. (Rogers, Conn.) has started construction of facilities that will double the output of diallyl phthalate molding compounds at its Manchester, Conn., plant. Completion is due in August.

Phenolic Derivatives: Pitt-Consol Chemical Co. (Newark, N. J.) will put onstream next month a new plant to produce alkylated and butylated phenolic and mercaptan derivatives. This will expand the line of intermediates Pitt-Consol supplies to the pharmaceutical and chemical industries.

foreign roundup

Rounding out the week's international news.

Petrochemicals/Spain: The Spanish government has ordered construction of a 160-mile, $10-million pipeline from Malaga on the Mediterranean to the Calvo Sotelo refinery at Puertollano. The line will have crude oil capacity of 2.5 million tons/year, part of which will go to a new petrochemicals plant at Puertollano. The pipeline is due for completion late next year, when the petrochemical plant is expected onstream.

Polyethylene/Japan: Wallace & Tiernan (Belleville, N. J.) has signed an agreement with Yoshitimi Pharmaceutical Industries (Osaka) for production in Japan of catalysts used in making high-pressure polyethylene. Capitalization will be on a 50-50 basis.

Aluminum/Sweden: Aluminium Ltd. (Montreal) has agreed to sell its half interest in the Swedish aluminum smelting company, A/V Svenska Aluminium Kompaniet, to A/B Svenska Metallverken for about $7 million. This gives Metallverken full ownership. Aluminium Ltd., which supplies all the Swedish company's alumina, will add to its substantial holdings in Svenska Metallverken.

Nitrogen Fertilizers/Iraq: Work has started on a $3-million gas pipeline from southern Iraq's Rumeila oilfields to the Basrah power station and the site of a projected ammonium nitrate fertilizer plant at Abu Floos. Completion is due next March. Natural gas will provide power supply and raw material for the fertilizer unit. Iraq's Economic Development Board has also awarded a $1.2-million contract to a U.S. firm for a topographical survey and soil investigation of the fertilizer plant site.

Montecatini miner Vittorio Castellano (right) makes a case for more pay. His improving economic lot reflects impact of growing chemical investments in Sicily.

CPI Brings New Life to Old Sicily

Today's Sicilian worker, awakened from the stupor of rural poverty, typifies the changes being wrought by the prosperity of chemical process industries on the ancient Italian island.

With minerals, crude oil and gas available locally and from nearby North Africa and the Middle East, plus its strategic location for tapping Mediterranean and European markets, Sicily has lured heavy investments from Italian and U.S. companies.

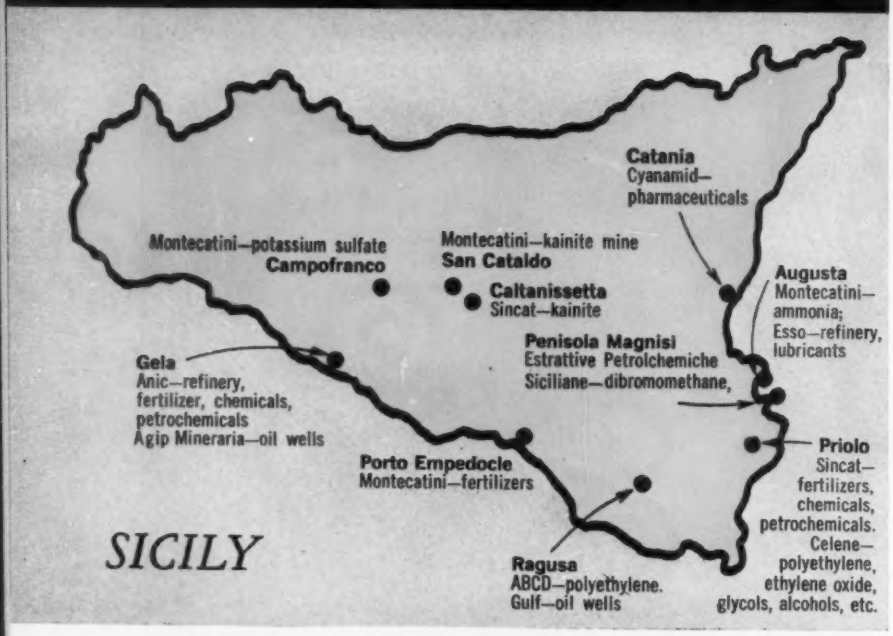
By the end of '61 four of the largest Italian chemical companies and several U.S. chemical and petroleum producers will have invested close to $500 million in chemical and petrochemical plants in Sicily. More than 10,000 Sicilians will be needed to run the plants.

And all this has been done in less than five years. In fact, industry's mark is still quite raw. One hundred yards from the husky bulldozers gouging out plant sites, farmers till the land with ancient plows. Smokestacks and chemical cracking columns rise next to primitive hovels.

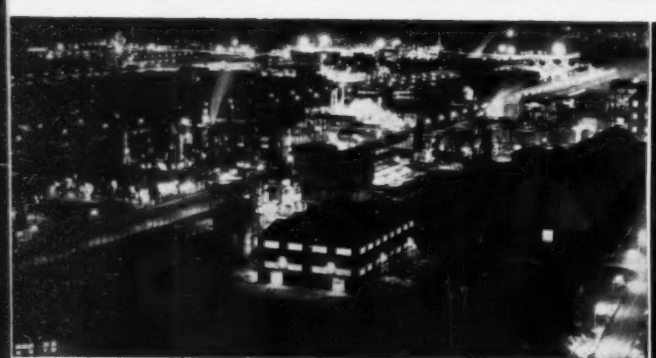
Pouring Out Fertilizer: A process industries tour of the industrializing island begins in the heart of Sicily, where Montecatini operates a $20-

Sicily's new industrial working class likes its economic gains. Now it is pressing for more.

Sicily: New CPI Projects Dot an Ancient Land



Government-owned petrochemical works springing up on barren coastline at Gela is next to oil fields, includes a refinery. It will produce chemicals, fertilizers, plastics. Due onstream in '63.



Largest complex in region is Edison's Sincat works on Gulf of Augusta. Sprawling over 1,000 acres, it uses local and imported raw materials, produces plastics, fertilizers, chemicals.

Highly efficient potassium sulfate plant is operated by Montecatini near kainite mines. It ships output to other company plants on island and directly to customers abroad

million potassium fertilizer complex.

Campofranco refinery, up since October, is supplied from Montecatini's kainite mines at nearby San Cataldo and Stincone. Nearly 3,000 tons/day of crushed ore are carried on an 11-mile cableway to the refinery, alongside the Platani River. There it's converted into potassium sulfate and magnesium chloride. The latter is leached out, leaving the sulfate. About 150,000 metric tons/year are produced now, although capacity is 200,000 metric tons. The plant can supply all of Italy's potassium needs and still ticket 50% of output for export.

Part of the potassium sulfate goes directly to consumers as fertilizer. The rest Montecatini ships about 25 miles to its Akragas plant, at Porto Empedocle on Sicily's Southwestern coast. Here Montecatini turns out about 42,000 m.t./year of simple and complex fertilizers, along with 35 m.t./day of phosphoric acid (from North African phosphate rock) and sulfuric acid (from Sicilian sulfur). The plant's ammonia requirements come from Montecatini's Augusta plant on the Eastern coast.

Right now, workers are racing to triple fertilizer and phosphoric acid capacity at Akragas by the end of the year.

Government Complex: Down the coast about 50 miles, just east of the town of Gela, the bare land suddenly erupts into activity. On a 1,225-acre site, Anic—chemical arm of ENI, the government's petroleum trust — is building a sprawling, $200-million refinery and petrochemical complex. It's due to be in operation at the beginning of '63.

The refinery will have a total capacity of 3 million m.t./year of varied products. The chemical plants will turn out 210,000 m.t./year of sulfuric acid, 65,000 tons of ammonia, 150,000 tons of ammonium sulfate, 100,000 tons of urea, 4,000 tons of propylene tetramer, 15,000 tons of polyethylene, 2,600 tons of ethanolamines, and 14,000 tons of ethylene glycols.

Raw materials will come from two major sources: (1) Agip Mineraria, another ENI subsidiary, which will supply 2 million m.t./year of crude oil from its adjacent field; and (2) Russia. ENI is importing Soviet crude, which is similar to that from Sicily,

at a 3-million tons/year rate.

The crude will be cracked in a nonresiduum process, yielding cracked distillate, coke and gas. The coke will feed the complex's 150,000-kw thermal power plant. Gases will serve as a source of petrochemicals, while the cracked distillate—comparable to Middle East crude, ENI says—will yield 420,000 m.t./year of light distillates and 700,000 m.t./year of fuel oil. The only plant now operating at Gela is a 100,000-tons/year pilot refinery, which yields asphalt and fuel oil.

Ragusa, where Gulf Oil discovered oil in '53, is the birthplace of the island's petrochemical industry. The area's raw-material availability (Gulf produced 1.4 million tons in '60) prompted Asfalti Bitumi Comentie Derivati—an affiliate of Bomprini Parodi Delfino (Rome)—to build a 12,000-m.t./year high-pressure polyethylene plant there.

Chemical Spectacular: But the most impressive sign of the chemical process industries' impact on Sicily is the aggregation of towers and tanks rimming the Gulf of Augusta.

Heart of this industrial area is the Rasiom refinery, in which Esso Standard Italiana has controlling interest. Drawing crude from Ragusa and the Middle East, the refinery supplies raw materials to all the petrochemical plants in the area. Its capacity is being expanded from 5.2 million m.t./year to 8.5 million.

Nearby, Esso is building a lubricants plant, claimed to be the largest in Europe. It's slated to produce 200,000 m.t./year, starting in '63. Special oils, paraffins, and derivatives may also be produced.

Part of the refinery output goes to Montecatini's Augusta Petrolchimica ammonia plant, capacity of which is being boosted from 100 to 200 m.t./day and to which will also be added a urea unit.

Roomy Layout: Sincat (Societa Industriale Catanese), subsidiary of Societa Edison, is the largest complex in the area, sprawls over more than 1,000 acres. It produces about 1 million m.t./year of simple and complex fertilizers and a range of chemicals.

For its simple, binary and ternary fertilizers, Sincat, like Montecatini, makes sulfuric acid from Sicilian sulfur, uses the acid to process North African phosphate rock into 800 m.t./day of superphosphate (by the Monsanto-Lurgi route).

It draws Ragusa crude from the Gulf-Rasiom pipeline to make ammonia and nitric acid.

Long Haul: Potash, for potassium sulfate, comes from Sincat's kainite mines in San Caterina, not far from Montecatini's San Cataldo mines.

Using its own process (generally similar to Montecatini's), Sincat transforms the kainite ($KCl \cdot MgSO_4 \cdot H_2O$) into potassium sulfate and magnesium chloride, and, as in Montecatini's plant, the chloride is then leached out.

Sincat's potassium sulfate setup is less economical than Montecatini's right now, since Sincat must truck the ore halfway across Sicily to the refinery, whereas Montecatini conveys ore to its nearby plant.

But Sincat plans to expand its refining capacity, at which time it will change its setup.

Another local raw material used by Sincat is rock salt, which it electrolyzes to caustic soda and chlorine. The chlorine is used, in part, to make more than 100,000 m.t./year of chlorinated solvents, dichloroethane, perchloroethylene and ethyl chloride.

From the Rasiom refinery, Sincat takes straight-run gasoline and, by means of light thermal cracking, produces ethylene, propylene, butadiene.

Ethylene Complex: Facing the Sincat complex across the road is the $40-million plant of Celene, owned 50-50 by Edison and Union Carbide. Onstream about a year, Celene uses Sincat ethylene. The complex includes a carbide-process low-density polyethylene plant with capacity of over 30,000 m.t./year, turns out base resins and film-grade polyethylene.

Other products include 1,300 m.t./month of ethylene oxide, and 2,000 m.t./month of other ethylene products—ethylene glycols, ethanolamines and polyglycols. New units under construction will produce "substantial quantities" of alcohols obtained by oxysynthesis from olefins, and propylene derivatives.

Both Sincat and Celene have ambitious expansion programs. Sincat has already poured about $160 million into its complex and by the end of '63 will add $90-95 million, expanding operations to include upgrading the by-product gasoline from cracking operations for olefins manufacture.

Farther up the coast, on a slender peninsula, Penisola Magnisi, which splits the Gulf of Augusta, Estrattive Petrolchemiche Siciliane (Espesi) operates a 250 m.t./month dibromomethane plant. It extracts bromine from sea water, and draws ethylene from Sincat. (Dibromomethane is used in making tetramethyl lead.) Espesi plans to enlarge the plant fourfold.

North of Augusta, at Catania, American Cyanamid's subsidiary, Cyanamid Italia, produces pharmaceuticals and is putting up a fermentation plant. Most of the output is exported to the Italian mainland, to other points in Europe and to South America.

Cake of Custom: Chemical process firms bringing modern industry to ancient Sicily have had to face a host of problems. In the process, they have triggered a series of economic, social and political repercussions.

The biggest of these problems was Sicily's lack of skilled labor. Montecatini, Edison and Anic have imported part of their skilled labor from the North and are constantly canvassing Sicilian professional and public schools for candidates. Some of these are trained on the spot; others go to the companies' Northern plants for training.

Once trained, management men say, Sicilian men are good workers, and they're as easily trained as Italians from the mainland. About 85% of the new industry's labor forces are Sicilians.

But managers have also had to adapt themselves in dealing with the Sicilians. They have found the local men sensitive, proud and "on the defensive," have had to develop the arts of persuasion in dealing with them.

"The worst thing one can do is to fly off the handle at one of their mistakes, or to insult them," one plant manager told *CW*'s correspondent (*see Behind the News, p. 5*). " 'Please tell me in a nice way,' they say." But in return for gentle treatment, the Sicilian workers have proved themselves respectful, loyal, honest.

And adjusting to the new industrial experience has been a problem for the Sicilians. The newly hired, free-wheeling, individualistic Sicilian farmer doesn't understand or accept the disciplines—the rites of punching time clocks, collective bargaining, the routine of fixed working hours. The ac-

ceptance of industrial practices still isn't complete.

New vs. Old: The collision of new and old interests, moreover, often results in slow-ups. One company, for example, has been prevented by the local authorities for the last five years from bringing its fertilizer trucks into the port area of the town in which it has its plant. Reason: the carters' association claims this would deprive its members of work. So the sacks are trucked from the plant to the port entrance, then unloaded and hauled by mule cart to the dock. The frustrated company offered to give the carters some trucks to speed up the operation, but the suspicious carters refused.

To top it off, this company has to pay port authorities a 9¢/ton toll, instead of the normal 0.06¢ rate, as compensation to workers laid off because the company automated its port.

Whetting the Appetite: Outside the glittering fringe of new industry along the coast, most of Sicily is still sunk in barren poverty. The promise of new jobs—evoked, for example, by the recent discovery of oil in the Gela hinterland—causes celebrations.

Such reactions are easy to understand. Before industry came to Sicily, a farmhand was considered successful if he earned $320/year. Today that farmhand can earn up to $1,200/year in industry.

But where industry is established, it hasn't taken long for workers to become impatient for greater gains. Labor has become more union-minded, more aware of its class status.

Montecatini miner Vittorio Castellano (*picture, p. 29*) is typical. Castellano works in a San Cataldo kainite mine, belongs to a leftist union. He admits that Montecatini respects labor contracts and pays much more than the minimum wage, that he has a three-room apartment equipped with radio, TV and a refrigerator—rarities in Sicily.

But this only whets his appetite. At his post some 230 ft. down in the mine, he animatedly stated his case to *CW* reporter Gene Di Raimondo: "Italy is divided into 13 scaled-wage zones. The difference in wages between the first and the last zone is 38%. Why should we be considered 11th zone in Sicily when the cost of living is as high as anywhere else in Italy?"

A Sicilian skilled worker earns roughly $3 to $3.50/day, plus the family allowance of $6.50/month for each child and $6 for his wife. This is well above the 11th zone minimum wage for skilled workers of $2.20/day.

The unions want the region upgraded to the 7th wage zone, far closer to the scales the companies are actually paying. Industry claims this would discourage middle-size companies, which allegedly couldn't afford such wages. Sicilian workers retort that industry never misses a chance to show its paternalism, in this case by making the easy gesture of paying higher than the very low minimum wage.

But alongside modern-minded Vittorio Castellano one still finds the more traditional European worker, such as the one who told *CW*, "My union is Montecatini." He finds in the impersonal industrial complex the security, guidance and protection that his forebears found in the feudalistic landlord.

Transportation and water supply problems also beset Sicily's new industries. Road and railroad connections and port facilities are inadequate, and some chemical companies have had to build their own. One fertilizer firm has dug wells near its plant to increase its water supply and is prospecting for water, even though whatever water it finds belongs to the region, which can dispose of it at will.

Blighted Government: In theory, Sicily's government is helping to attract industry to the island. Sicily's government is semiautonomous, with investment laws differing from those of the rest of Italy and in a way that could encourage industry.

By these laws, the regional government can contribute up to 20% of the cost of a new plant or expansion programs for middle-size and small industries in towns with populations of less than 200,000, for buildings, roads, water, power and oil lines. It can finance part of the investment at a 6.5% interest rate, reduce the general income tax from 3% to 1.5%, and sometimes entirely lift company and local taxes. Moreover, industrial equipment imports are free from customs duty. Despite all this, middle-size and small industries are conspicuously absent.

In reality, the government has been ridden with greed, graft and nepotism, which have filled the papers with scandals. The central government in Rome has allotted substantial sums of money to Sicily through the Cassa per il Mezzogiorno, an organ for the economic development of Italy's South. But very little has been done. About $250 million is known to be still idle in Banco di Sicilia, the regional bank.

Industry men cite the case of a regional congressman, who diverted government funds to a road-building project for his home town. The money was earmarked for construction of a road needed by a chemical firm.

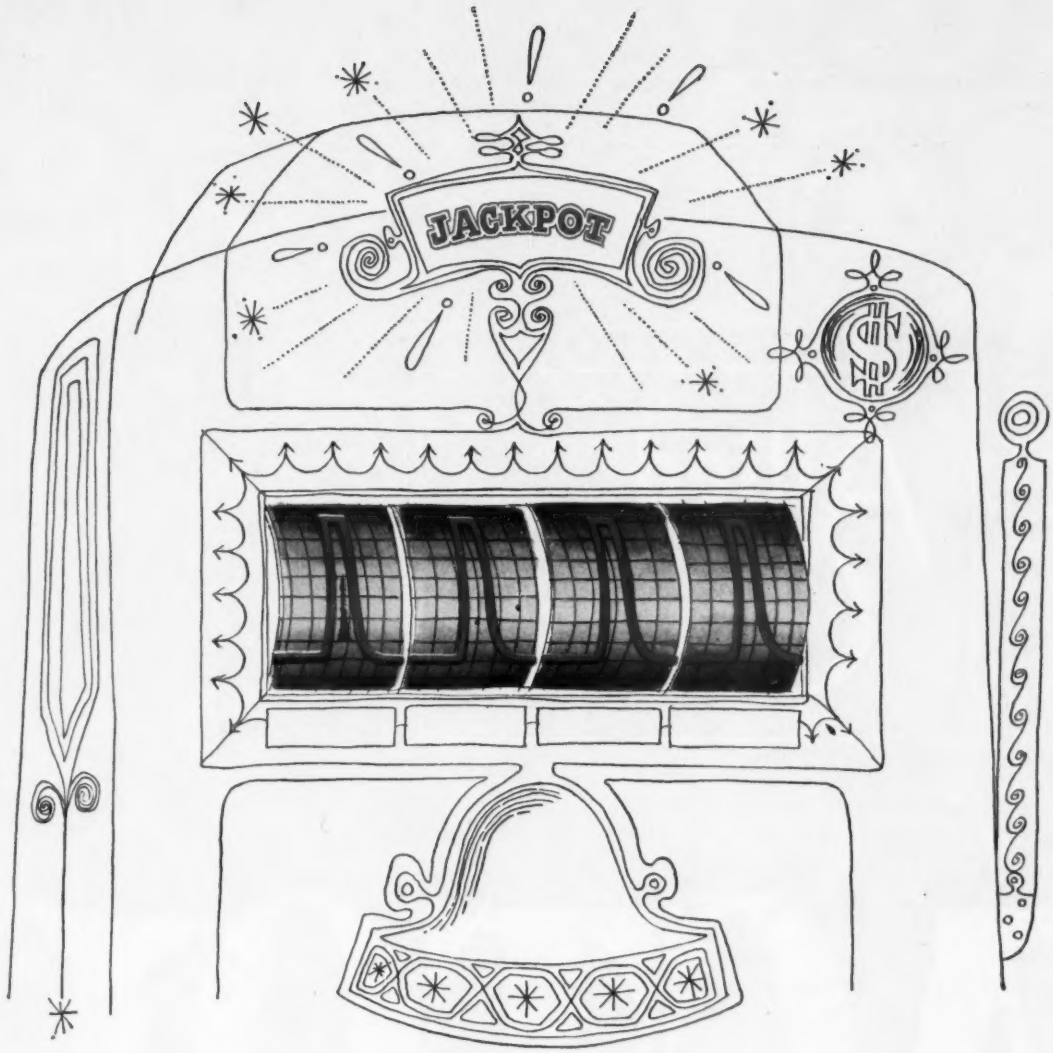
One local official, angered because a company didn't hire a person he recommended, halted plant construction.

On the Doorstep: With or without government help, chemical processors have moved into Sicily because of its mineral wealth and geographic position. An industrial chain reaction has been set in motion, with new ventures on the way.

The Pirelli Co., big rubber producer; Snia Viscosa, synthetic fiber giant; and Spadaro-Ventura, a Sicilian pharmaceutical company; all reportedly plan to build plants in the Gela area.

Long ago, when Mediterranean trade flourished, Sicily was prosperous. Now, with the development of the Middle East and North Africa, the cycle seems to be recurring. For the doorstep to Europe is Sicily—and standing on the threshhold are flourishing chemical process plants.

Pointing up Sicily's progress: mule cart and modern kainite complex.



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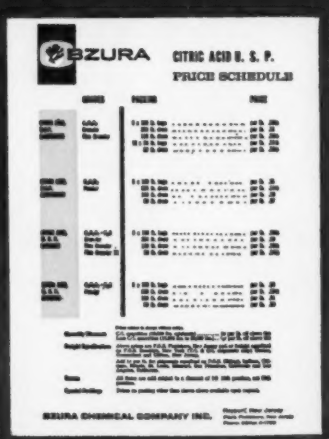

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Washington Newsletter

CHEMICAL WEEK
June 17, 1961

The chemical industry stands to win either way in one of the hottest races of the space age. It's not the race between the U.S. and Russia—but between the Air Force and the National Aeronautics and Space Administration to develop a big 12-million-lb.-thrust, first-stage rocket booster needed to land a man on the moon.

When President Kennedy officially put the U.S. in the international race to the moon, the Air Force was given responsibility—and money—to try to develop the required solid-fueled rocket booster. It will be in direct competition with NASA's 1.5-million-lb. thrust, liquid-fueled F-1 engine under development by Rocketdyne.

The Air Force has been lobbying for the go-ahead to develop big boosters since former President Eisenhower slapped a 1-million-lb. thrust limitation on military booster development about a year ago. The military has been supporting research on solid fuels all along without exceeding this limitation.

Now that the wraps are off, the Air Force will press hard to jockey NASA out of the top position in space. The reasoning is that if the Air Force can come up with a booster for the man-to-the-moon program ahead of the civilian agency, the military would be predominant in future space programs. More than simple prestige is involved. The Air Force is out to prove its technical and managerial superiority.

It is not difficult to find Air Force sentiment that calls for relegating the civilian space agency to the status of a technical staff, at the beck and call of the military. This generally was he status of NASA's predecessor, the National Advisory Committee on Aeronautics.

•

Increased military interest in solid-propellant rockets is shown in award by the Air Force of $1.8 million worth of contracts to five firms for applied research in high-energy solid propellants. Contracts went to Aerojet-General, Atlantic Research, Du Pont, Thiokol and United Technology Corp.

Purpose of the program: "to develop a new family of solid propellants which will have even higher energy and performance characteristics than those presently used in the Minuteman and Polaris missiles." Specific impulse of the current family of operational solid-fueled missiles is 245. Target of the new program is a solid-propellant rocket with a substantially higher specific impulse. The precise goal is classified.

The new Air Force program differs from the two-year-old Project Principia of the Defense Dept.'s Advanced Research Project Agency. The emphasis in ARPA's project is on fundamental research in propellant chemistry. Principia contractors are aiming to create what one Pentagon official calls "radicaly new raw materials." Beryllium figures in some of

Washington Newsletter

(Continued)

the studies. Among major contractors in project Principia: Esso, Dow Chemical, Minnesota Mining and Manufacturing, American Cyanamid.

•

Manufacture of hydrazine liquid rocket fuel in a chemonuclear reactor is the object of a new $3.5-million Air Force contract with Aerojet-General. Hydrazine can be made in nuclear reactors by using the energy of fission fragments to break up ammonia molecules (*CW, Dec. 17, '60, p. 23*).

In an initial phase of the study, already completed, Aerojet proved out the efficiency of chemonuclear reactors. Efficiency factors show that hydrazine can be made for 25¢/lb. The going rate is $1.20/lb. by conventional methods (*CW, Market Newsletter April 15*). Air Force use of hydrazine runs to millions of pounds a year.

Under the new contract, Aerojet will try to develop a process by which hydrazine can be made continuously in a reactor. The chief area of investigation at the moment is a loop or some suitable configuration for running ammonia through the reactor and submitting it to sufficient irradiation.

•

Purchase of U.S.-produced chemical fertilizers is bound to get a boost under the new, highly publicized aid package to Pakistan. The U.S., five other countries and the World Bank have committed $320 million to Pakistan development, in addition to an earlier $230 million.

Most of the new money will be in the form of long-term loans. Though plans still are too tentative to determine exactly how the funds will be spent, U.S. officials are certain that the purchase of chemical fertilizers to boost Pakistan's agricultural output will be a major program. And most of the money contributed by the U.S.—about $280 million—will be spent in this country by Pakistan.

•

Reorganization of the National Agricultural Chemicals Assn. staff has been revealed by President George R. Ferguson. The new organization, effective next Sept. 1, is designed to create career positions for all operating units of the staff. Ferguson, president of Geigy Agricultural Chemicals, will become chairman of the board. H. F. Tomasek, president of Chemagro Corp., will be vice-chairman.

•

A large number of nerve gases have been developed by Russia, according to the U.S. Chemical Corps. W. C. Black of the Corps' Intelligence Service told the House Appropriations Committee recently that the gases are odorless, tasteless and colorless. He said Russia has huge stockpiles of such gases.

The testimony was heavily censored for security reasons. But enough was left intact to reveal Black's belief that the Sino-Soviet Bloc is ahead of the U.S. in chemical and biological warfare developments.

2-NITROPROPANE

THE BENEFITS OF 2-NP AS A SOLVENT FOR VINYL AND EPOXY COATINGS

A report from

COMMERCIAL SOLVENTS CORPORATION

NITROPARAFFINS DEPARTMENT

COMMERCIAL SOLVENTS CORPORATION

NITROPARAFFINS DEPARTMENT

260 MADISON AVENUE, NEW YORK 16, N. Y.

Atlanta • Boston • Chicago • Cincinnati • Cleveland • Detroit • Los Angeles • New Orleans • Newark • New York • St. Louis
San Francisco • IN CANADA: The McArthur Chemical Co. (1958) Ltd., Montreal • IN MEXICO: Comsolmex, S.A., Mexico 7, D.F.

SUBJECT:	2-Nitropropane	DESCRIPTION:	Solvent for vinyl and epoxy coatings
ACTION DESIRED:	Consider 2-NP to achieve higher quality at lower cost		

General

2-NP ($CH_3CHNO_2CH_3$) is a member of the extraordinarily versatile CSC Nitroparaffin family. Its most outstanding characteristic is its unique solvent property which permits the use of larger proportions of low cost alcohols and aromatics in solubilizing a wide variety of coating materials, dyes, organic chemicals, fats, and oils. This unique property is of special interest in the formulation of vinyl and epoxy coatings.

Solvent for Vinyls

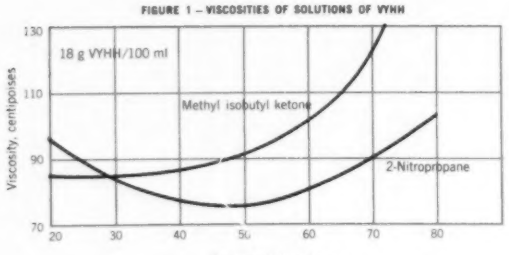
With the introduction of 2-NP – for the first time – formulators of vinyl chloride-acetate copolymers were able to obtain coatings with 1) lower viscosity and/or higher solids, 2) medium evaporation rate with better flow, 3) improved solvent release resulting in reduced drying time, and 4) mild odor. In addition to these advantages, the ability of nitrated solvents to displace water results in coatings with better adhesion to hydrophilic surfaces and better weathering properties due to improved dispersion. 2-NP's high flash point and low volatility provide added safety factors.

Research and field experience in the packaging industry has shown that the high solids content of 2-NP-formulated vinyls offers important advantages in the high-speed coating of food and beverage containers. 2-NP also proves useful in vinyl ink applications since it does not attack gelatin or most rubber rolls but still provides outstanding adhesion or "bite" to many plastics.

Low Viscosity and/or High Solids Content

2-NP can be formulated to give vinyl solutions of higher solids content and/or lower viscosity than any other medium evaporating solvent. A typical comparison is shown in Figure 1. In addition, 2-NP solutions have good stability and show no tendency to gel.

FIGURE 1 – VISCOSITIES OF SOLUTIONS OF VYHH



Evaporation Rate

The table below illustrates the desirable evaporation rate of 2-NP.

Evaporation Rate Of 2-NP Compared To Other Solvents (Volume)

Acetone	975
MEK	568
Toluol	197
MIBK	186
2-NP	110
n-Butyl Acetate	100
Xylol	69
Cellosolve	38
Isophorone	4.3

Although 2-NP has a slower evaporation rate than many solvents, it escapes from a vinyl film more rapidly than most of the faster solvents shown in the above chart, thus relieving problems of print resistance and residual odor.

Reduced Cost

To evaluate the economics of 2-NP in comparison with another medium evaporating solvent, such as MIBK, we should again refer to Figure 1. We note that in order to obtain comparable solids and viscosities in VYHH* solutions a 50-50 mixture of MIBK-toluol should be replaced by a 30-70 mixture of 2-NP-toluol. This makes it possible for a vinyl formulator to save over $600 in raw material costs for each tank car of MIBK he now uses, as evidenced by the following calculations:

8,000 gallons MIBK	=	$7,749.00
8,000 gallons toluol	=	2,000.00
16,000 gallons 50-50 mixture MIBK-toluol	=	$9,749.00
4,800 gallons 2-NP	=	$6,336.00
11,200 gallons toluol	=	2,800.00
16,000 gallons 30-70 mixture 2-NP-toluol	=	$9,136.00
	=	$ 613.00 Savings

Solvent for Epoxies

Solvent mixtures based on 2-NP have been found to be superior to other solvent systems for epoxy coatings cured at room temperature. Improvements brought about by the use of 2-NP include much greater chemical resistance, marked reduction in pinholing and water vapor permeability, minimized crawling and cratering, and improved adhesion.

*Bakelite

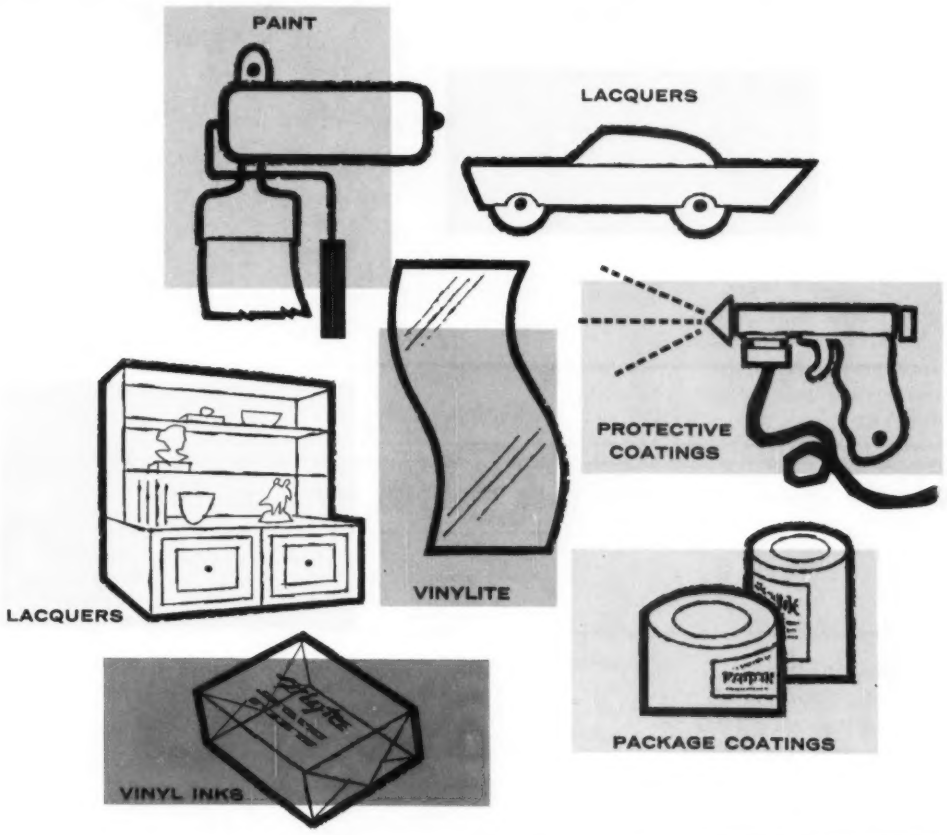
2-NP is compatible with amine catalyzed systems (with the exception of ethylene diamine) and systems employing urea-formaldehyde, polyamides, or phenolic cross linking agents.

As a rule of thumb, epoxy solvent systems formulated with 2-NP should contain an alcohol in an amount equal to the amount of 2-NP present. A solvent system containing equal parts of 2-NP, alcohol, and aromatic hydrocarbons is suggested as a starting formulation. Other systems can be used with very satisfactory results; however, a 2-NP concentration below 17% tends to minimize the advantages which can be obtained by its use. These advantages are available at no increase in cost since properly formulated solvent blends containing 2-NP are competitive in price with other solvent formulations. 2-NP has an ideal evaporation rate for spray systems and contributes the favorable flow properties that are indispensable for good finishes.

The ability of nitrated solvents to wet pigments and hydrophilic surfaces, as previously mentioned in the section entitled *Solvents for Vinyls*, also applies to epoxies as well as other vehicles used by the coating industry.

Want more information on 2-NP for Vinyls and Epoxies?

If you would like to have test samples and complete technical data on 2-Nitropropane for your vinyl and epoxy formulations, fill in and mail the coupon below. Or perhaps you would like to have one of our technical representatives look into your particular problem? If so, just mark the coupon accordingly, or drop us a note in the mail.



For samples, technical data, use this coupon

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*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

PHYSICAL PROPERTIES OF 2-NITROPROPANE

FLASH POINTS
(°F Tag Open Cup) of 2-NP
Compared to Other Solvents

Acetone	16
MEK	30
Toluol	56
MIBK	81
Xylol	85
n-Butyl Acetate	92
2-NP	103
Cellosolve	126
Isophorone	202

Comparison of Lower Limit of Flammability of 2-NP With Other Solvents
(% by volume in air)

MIBK	0.9
Xylol	1.0
Toluol	1.27
n-Butyl Acetate	1.7
MEK	1.8
Acetone	2.15
2-Nitropropane	2.6
Cellosolve	2.6

PHYSICAL PROPERTIES OF SOME VINYL SOLVENTS

	2-NITRO-PROPANE	NITRO-METHANE	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE
Molecular Weight	89.09	61.04	72.10	100.16
Boiling Point, °C	120.3	101.2	79.6	116.0
Vapor Pressure at 20°C, mm	12.9	27.8	77.5	18.1
Specific Gravity at 20/20°C	0.992	1.139	0.806	0.802
Weight per Gallon at 68°F, lb.	8.24	9.48	6.72	6.68
Gallons per Pound at 68°F	0.121	0.105	0.149	0.150
Red Label Required	No	No	Yes	No
Heat of Vaporization at 30°C, cal/g	104	143.3	112.3	93.2
Solubility in Water at 20°C, % by volume	1.7	9.5	31.80	2.5
Solubility of Water in Solvent, % by volume	0.6	2.2	10.90	1.7

Parke, Davis' Samyn: A single suspending agent isn't the answer.

Seeking Stable Suspensions

Last week at bucolic Land O'Lakes, Wis., pharmaceutical researchers met to ponder the complex problem of eliminating the "shake well" label from medicine bottles. Occasion was the third annual National Industrial Pharmaceutical Research Conference, sponsored by the University of Wisconsin. This year, the whole conference was devoted to the "physical stability of disperse systems."

Other recent developments in this increasingly important field include a special symposium held by the American Pharmaceutical Assn.* and a supersensitive rheometer developed at the University of Michigan.

Originally drug suspensions were made more or less as a stopgap measure, simply because solutions were difficult to prepare. More recently, however, suspension formulation has become the preferred method for a number of reasons. Most important: many drugs are less stable (chemically, biologically or both) in solution than as solids in suspension. Other factors favoring suspensions include better control of taste, rate of release to the system and dosage amount.

The main drawback of suspensions is that they tend to settle, thus obliging the user to shake the container before using the product. If the drug precipitates as a floc, the result may be inconvenience, unattractive appearance and possibility of not obtaining a dose of the proper strength.

But if the precipitate is made up of small individual crystals, there is a strong chance of caking. In this event, the drug cannot be put back into suspension even with shaking.

The importance of improving suspension stability really hit the pharmaceutical industry just a few years ago. Drug company researchers have been working closely with their counterparts in universities to develop both the basic physical chemistry of suspensions and its practical application to pharmaceutical products.

Two-Way Approach: A combination approach to the formulation of stable suspensions was reported to the APhA symposium by Joseph Samyn of Parke, Davis & Co. Selecting viscosity as the easiest variable to work with, Samyn proposes the use of two kinds of suspending agents to give a medium that is more viscous at rest (to prevent settling) than it is in motion (to allow pouring).

One type of suspending agent (e.g., sodium carboxymethyl cellulose, methyl cellulose or sodium alginate) gives a "pseudoplastic" suspension—one whose viscosity drops with increasing shear rate (equivalent to increasing motion). Suspensions with plastic flow properties (including "yield value," an amount of force that can cause a gel to start flowing) can be produced by using another type of suspending agent—e.g., bentonite or commercial clays such as R. T. Vanderbilt Co.'s Veegum HV, National Lead Co.'s Thix and The Inerto Co.'s Macaloid. Samyn advises use of the combination because suspensions made with pseudoplastic agents alone will eventually settle, while those containing only plastic agents will entrap air and present pouring difficulties.

Samyn also points out that the amount of clay needed for effect as a suspending agent may not be as great as generally thought (2-5%). Since salts and surfactants that are generally added to the suspension have some flocculating action, the clay can be kept under 1% of the final formulation. In one favorable example, Samyn used 0.6% of clay (Veegum

* At its Aug. '60 convention in Washington, D.C.; papers from this symposium are being published in the June issue of the *Journal of Pharmaceutical Sciences.*

Purdue's Martin: Surface charges have to be canceled or there's trouble.

Abbott Labs' Frederick: Watch out for particle changes in suspension.

U. of Michigan's Mattocks: New rheometer can be a useful shortcut.

HV) with 1.2% CMC.

Other possible approaches referred to by Samyn: reducing particle size and adjusting the density of the suspending medium. The first requires reduction to colloidal size before settling is stopped, while the second is applicable to materials with densities below about 1.3. Recent U.S. patents using this approach are Sterling Drug's 2,921,884 and Johnson & Johnson's 2,904,469.

Avoiding Caking: Caking, a problem that can't be overcome by suspending agents, was considered by Purdue University's Alfred Martin at the APhA symposium. Particles with a high surface charge resist flocculation, tend to settle individually. Because of their relatively small size, they pack closely at the bottom of the container and are pressed into a hard cake by the weight of the particles that fall on top of them. Even vigorous shaking will not return these caked particles to the original suspended state. Martin's solution: cancel the surface charge that keeps the particles from flocculating.

This charge cancellation is carried out with a flocculating agent having a charge opposite to the particle's surface charge (e.g., positive aluminum chloride or negative monobasic potassium phosphate). Only half the problem is solved, however, as the flocs will still settle even though they won't cake. Thus the suspending agent is still necessary.

Since most suspending agents are negatively charged, they would join with any positive flocculating agent that had been used. This problem makes one more step necessary in the case of suspensions of negatively charged particles: coating them with a layer of a positively charged agent—e.g., gelatin or a fatty acid amine. Then a negative flocculating agent can be used, and there will be no incompatibility with the negative suspending agent.

Maze of Factors: The variety of factors that affect suspension stability is shown in the APhA presentation of Abbott Laboratories' Kenneth Frederick. The characteristics of the powder itself and the various changes that it can undergo in time are both of great importance.

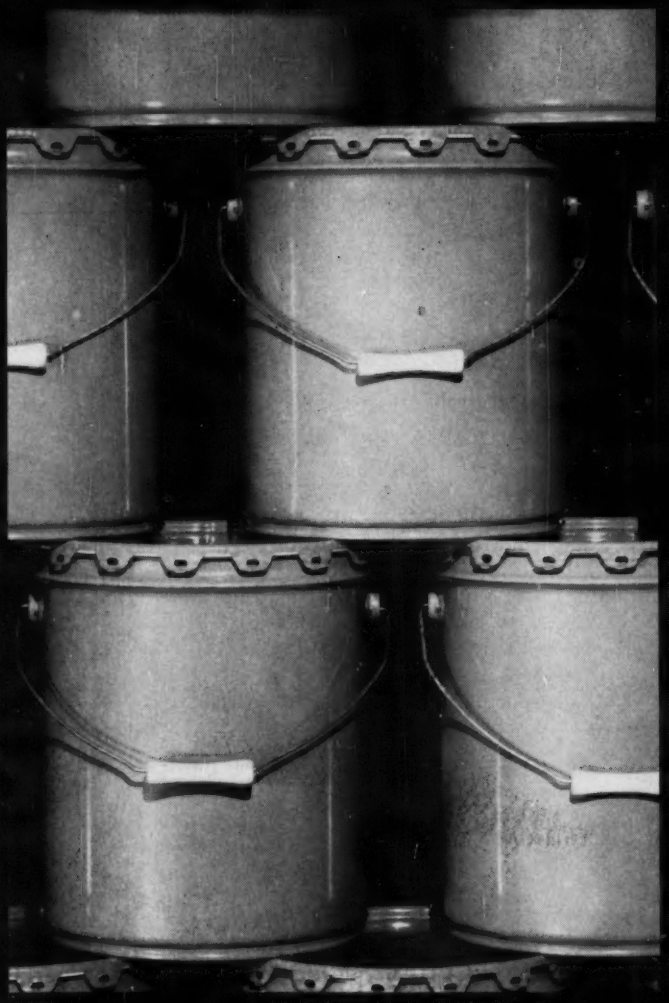
Variables that are present in the starting material include average particle size, particle-size distribution and surface area. The most useful of these measures, according to Frederick, is the surface area, which can range from 2,500 to 75,000 sq.cm./gm. (depending on whether coarsely milled or finely micronized). For use in injectible suspensions, Frederick recommends a blend of small and larger particles, because of the slower entry of the larger ones into the patient's system and the resulting prolonged action.

In addition to factors of the starting material, there are others that enter the picture after the suspension has been made. For instance, the particles may change in size or crystal habit (shape); they may form hydrates if added as anhydrous crystals; or they may form different polymorphs (space-lattice crystal structures of the same compound) that may have different solubility properties. This last point is particularly relevant, as many commercial drugs are actually long-lived metastable polymorphs that gradually convert into a more stable version that may not have the same pharmaceutical properties.

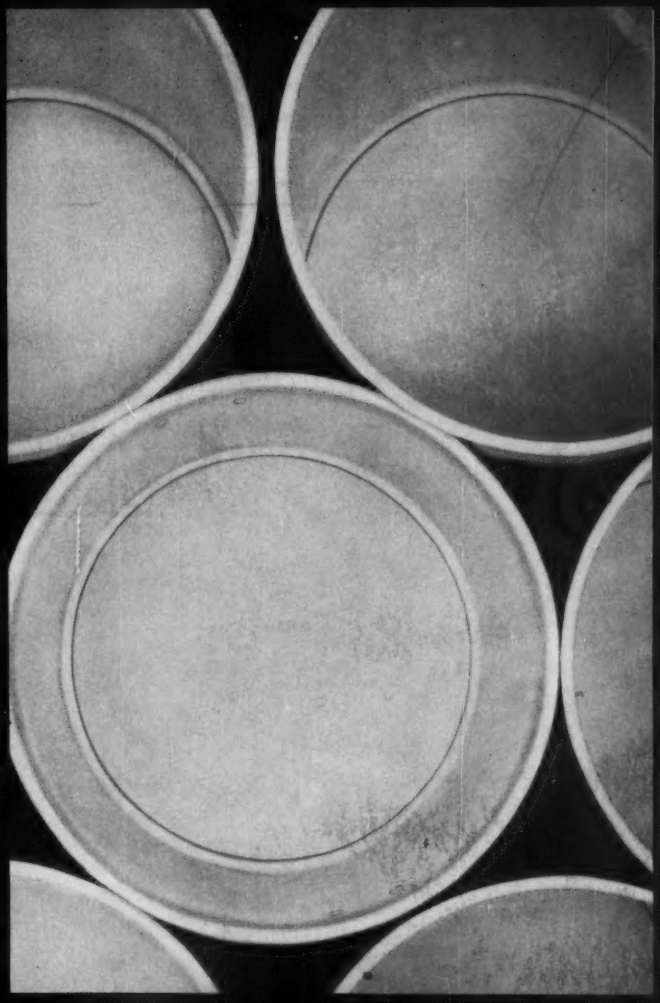
Better Measurement: Already in use at Upjohn and at Parke, Davis is a rheometer that allows direct measurement of the yield value of pharmaceutical gels. The viscometers now used measure flow curves above the yield value, require extrapolation to obtain this value. The new instrument is based on a principle already applied in the plastic and rubber industries. It was designed by Duncan McVean, a graduate student at the University of Michigan working under Albert Mattocks (*CW, May 13, p. 62*). Mattocks predicts that the device (which is not patented and is freely available to industry) will have great significance to pharmaceutical makers.

With it, he says, a company could type a wide number of suspending media according to yield value. From this inventory, the manufacturer could then choose the medium that best matches the characteristics of a specified drug.

The importance of further advances of this type are underscored by Upjohn's Robert Levin, who notes that the industry is deeply interested in getting many of its formulation practices on firmer scientific footing. The first step: boosting outlays for physical and colloid chemistry research.



ALL LINED PAILS LOOK THE SAME FROM THIS ANGLE



RHEEM PAILS LOOK THE SAME FROM THIS ANGLE, TOO

Rheem Centrifugal Lining process makes pail linings completely uniform...completely dependable

No pinholes, no blisters, no skips, globs nor thin spots occur in lining applied by this exclusive method. Thickness is controlled to 1/10 mil tolerance over every inch of pail interior.

The Rheem Centrifugal Pail Lining process was developed especially for coating the interiors of cylinders. By using the highly efficient principle of centrifugal force instead of conventional spray gun techniques, it assures a new excellence in protection for products packed in pails.

Every pail lining variable is controlled: amount of lining applied, application angle, application speed. All are invariably uniform ... and so are the finished linings. The automatic Rheem process eliminates air turbulence, human error and reduces solvent content, too.

It's a process that assures the same product purity on delivery as at filling.

If you are now using pails lined by another process, or using packages of other basic materials, write for samples, information on linings or a testing program to 1701 West Edgar Road, Linden, N. J. Plants across the country.

WORLD'S LARGEST MANUFACTURER OF STEEL SHIPPING CONTAINERS

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How it works: Pail shells move up to automatic Centrifugal Lining equipment (left). Positioning arms clamp pail and (right) raise it past spinning centrifugal applicator head. Angle, distance and speed never vary. Result: completely uniform linings – completely dependable protection for your product.

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RESEARCH

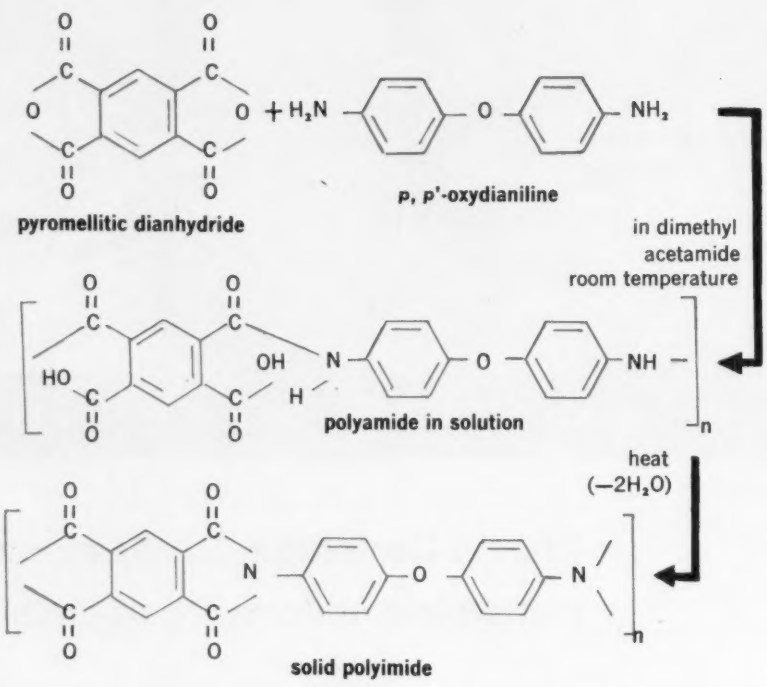
• An earth sciences observatory is being built at Leonard, Okla., by Jersey Production Research Co. (Tulsa), affiliate of Standard Oil Co. (New Jersey) and Humble Oil & Refining Co.

• Two new divisions at Air Reduction Co.'s Central Research Laboratories (Murray Hill, N. J.) are physical research, headed by Associate Director William Greene, and metallurgical development, headed by Assistant Director Gilbert Rothschild.

• About 200 Eastman Kodak Co. researchers are now occupying a new, 7-story physics building at Rochester, N.Y. The 200,000-sq.ft. structure will house 400 staff members when complete.

• The newly formed Quantum Electronics Laboratories of Quantatron, Inc. (Santa Monica, Calif.) will

Route to a Solid Polyimide



Polyimide: Key to New Du Pont Film?

The two-step reaction charted above may well be the route Du Pont uses to make its experimental high-temperature H film. The company won't comment on the composition of the product, but it does say that test samples of the amber-colored film are being evaluated by various companies for possible use in high-temperature insulation and other applications requiring a combination of unusual thermal, electrical, physical and chemical properties. It is said to resist all solvents, have high dielectric strength and dimensional stability and stability in air at 275 C for over a year. According to a Du Pont application (No. 58,424) for an Australian patent, a polyimide can be made from a diamine and a tetracarboxylic acid dianhydride. A polyamide-acid composition is formed first, then is converted into the polyimide by chemical or heat treatment.

What's News in Chemicals...

What comes out here depends on you...

Enjay tailors its production to fit your needs. Over the years it has pioneered in the development of many important new compounds to meet the changing demands of the chemical industry — products like isooctyl alcohol, decyl and tridecyl alcohols, and BUTON resins, to name but a few.

Latest in this series is new Enjay hexyl alcohol. Of particular interest to vinyl plastic compounders are the phthalate esters of hexyl alcohol. Their good solvating properties make them highly efficient as calendering aids. Hexyl alcohol has other important applications as a raw material for flotation agents, lubricant additives, degreasing fluids, brake fluids and agricultural chemicals. For specifications on the full line of Enjay alcohols, or other high quality chemicals, write to Enjay, 15 W. 51st Street, New York 19, N.Y.

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Pfaudler factory inspector electric-tests **Nucerite** bayonet heater (6⅝" dia. by 68" long) designed for experimental use in high-temperature sulphuric acid environment.

Progress report:

NUCERITE moves into limited production

Now, there is a practical way to cope with a broad range of corrosives in the 500 to 1500°F temperature range.

It's Pfaudler® Nucerite,* a recently developed family of ceramic-metal composites that resist corrosion at these high temperatures.

Various formulations of Nucerite have undergone field testing on a wide scale since this group of materials was introduced last year. Results indicate many practical applications for Nucerite in the 500 to 1500°F range. Very few materials available up till now would withstand these temperatures, and even then only under extremely limited conditions.

Limited production. Where field tests or lab data substantiate the serviceability of Nucerite in a given application, Pfaudler now accepts orders for production equipment of simple shape, rounded corners, and uniform cross section.

Successful tests. You can get some idea of the range of applications for Nucerite from this representative list of successful field tests:

1. Metal halides at 1292°F (a specialty alloy failed in this service in 2 to 3 weeks).
2. Cl_2 and CCl_4 mixture at 600°F (a quarter-inch stainless steel piece corrodes through in a matter of minutes).
3. Refractory metal chlorides at 485°F.
4. Coal tar pitch at 750°F (solid ceramic materials previously used failed here due to thermal shock).
5. Aqua regia plus heavy abrasive at 225°F (tantalum is the only metal which could withstand this condition).
6. HCl plus solids (100 f.p.s.) at 1112°F.

Nucerite equipment. Among the equipment for which orders have already been received, are the following: 6"-diameter pipe, 2½"-diameter boiler tube, 6⅝"-diameter bayonet heater (shown above), 12"- and 18"-diameter columns, finger baffles, and a 300-gallon "RA" series closed-top reactor.

Other characteristics. Nucerite offers the greatest potential in coping with corrosion at high temperatures. However, resistance to impact, abrasion, and rapid temperature change is also of importance for specific applications.

Data available may indicate which formulation of Nucerite can best solve your particular problem. If not, we invite your participation in a field evaluation program.

For more information, write to the address shown on the facing page.

*Patent applied for

Only 10 days from here to your plant

That's the delivery story on selected Pfaudler Glasteel reactors.

In standard sizes and assemblies you can get the reactor you need, shipped to your plant, just 10 days after receipt of your order.

This "off-the-shelf delivery" applies to completely assembled* Glasteel reactors in lab, pilot-plant and production sizes. Specifically, it covers the following: "P" series reactors in 30-, 50- and 100-gallon sizes; "E" Series in 200-, 300- and 500-gallon sizes; and "RA" series in 500-, 750-, 1000- and 2000-gallon sizes.

Complete specifications for these reactors are covered in Bulletins 927, 971 and 988, respectively.

Of course, all of these reactors bring you the many desirable features of Glasteel. Long life in corrosive service, since Glasteel is resistant to all acids (except HF) to 350°F and most alkalies at moderate temperatures. An essentially inert product-contact surface that protects purity, quality, and color. And a hard, smooth surface that resists build-up and is easy to clean.

When you need a reactor in a hurry, take advantage of the fast delivery and operational flexibility provided by Pfaudler's pre-stocking program.

In all, you can choose from 29 different standard models of Glasteel reactors, ranging in size from 1 to 4000 gallons. Normal delivery quoted, except as indicated here.

Write for free bulletins.

Why have wipers in an evaporator?

You'll find four wipers like this one in the Pfaudler Wiped Film Evaporator.

Their job: Wetting the entire evaporator wall with a *uniform*, thin film.

The result: High thermal efficiency and excellent heat transfer when you evaporate products that are heat sensitive, highly viscous, or low in thermal conductivity.

Free-floating, the blades are held in contact with the evaporator wall by centrifugal force. Note the slots—they

prevent curl and help accelerate product movement down and off the wall.

This gives you the best combination of full utilization of heat transfer area, an ultra-thin film for highest "U" values, and very short contact time at elevated temperatures.

The Pfaudler Wiped Film Evaporator is a high-capacity production unit, able to provide you with an evaporation rate of up to 50 lbs/hr/sq ft of heat transfer area, based on water.

Choose from standard models with 4 to 100 sq ft of evaporating area. If you need something larger, we'll fabricate on a custom basis.

Offer: Let us test your product at our Test Center. Or start by evaluating the data and specs in Bulletin 991.

Address all inquiries to our Pfaudler Division, Dept. CW-61, Rochester 3, N. Y. *In Canada, contact Pfaudler Permutit Canada Ltd., Toronto.*

Special gasket assures precise alignment for F-C Glasteel pipe*

This is the high-integrity glass-lined pipe that you can cut, thread, fire-polish and install right in the field. And to make sure that gaskets seat properly when you join sections, we've taken special precautions to assure precise alignment of the pipe axes.

Here's how: Flange bolt holes have been made *only* 1/16" oversize, rather than the conventional 1/8" oversize. In addition, the bolt holes in the gasket itself have also been made *undersize*. The gasket is thereby centered with the axial center line of the pipe and limits non-parallelism of the flanges.

Both the pipe and the gasket joints have been extensively tested — in the field and in our Test Center. For example, intermittent tests over a seven-month period were made with the following acids: 10% sulphuric, 10% nitric, and 20% hydrochloric. Pressures ranged

from 50 to 125 psi, with temperatures from 160 to 300°F. *There were no failures of either the glass lining or the gaskets.* Similar results have been reported for actual installations, including one of 850 feet, in operation since early last summer.

You'll find F-C pipe well suited to handling many "problem" liquids—corrosive, abrasive, and ultra-pure. It comes in 1½-, 2- and 3-inch diameters, with quick delivery on any length up to 10 feet. Write for Bulletin 987.

*Patent applied for

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

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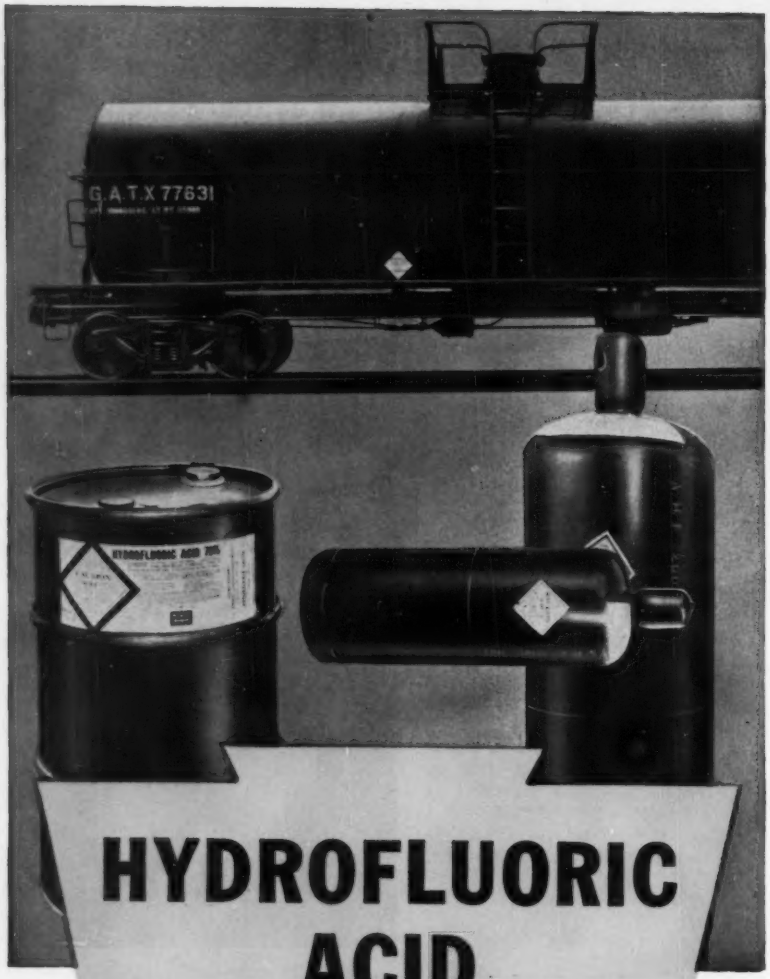

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be headed by R. A. Gudmundsen.

• Fabric Research Laboratories (Dedham, Mass.) plans to expand its chemical research activities, has named Donald Powers as assistant director of the firm in charge of these functions.

• York Research Corp. (Stamford, Conn.) has started construction of an 11,850-sq.ft. addition to its testing laboratories and headquarters, its fifth expansion in four years.

• Stanford Research Institute (Menlo Park, Calif.) has formed a Space Sciences Advisory Committee of nationally known experts to help coordinate SRI's current space work and to help develop new projects. SRI's present space contracts amount to about $5 million/year.

• W. L. Faith (2540 Huntington Dr., San Marino, Calif.) has started a consulting practice for evaluation of chemical and agricultural R&D programs.

• McNeil Laboratories, Inc., has completed its move from North Philadelphia to new manufacturing, research and administrative quarters in Fort Washington, Pa.

• Firestone Tire & Rubber Co. (Akron, O.) has created the new post of vice-president in charge of research and has named John Street to it; he has been director of chemical labs.

• Volk Radiochemical Co. (Skokie, Ill.) has moved into new laboratories at 8260 Elmwood Ave.

• Micro-Tek Instruments, Inc., recently dedicated its new, 10,000-sq.ft. building at 550 Oak Villa Blvd., Baton Rouge, La.

PRODUCTS

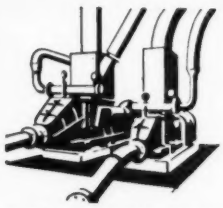
Beryllium Compounds: Nuclear Materials and Equipment Corp. (Apollo, Pa.) is now offering high-purity anhydrous compounds of beryllium, including the fluoride, chloride, bromide and iodide, as well as other compounds.

•

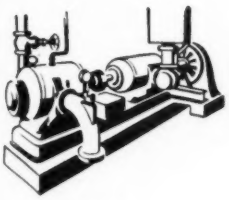
Lithium Organic: A new organolithium compound — 2,6-dimethoxyphenyllithium — is now available in experimental samples from Lithium Corp. of America (500 Fifth Ave., New York 36). Proposed uses are in pharmaceuticals and in stereospecific rubber catalysis. Research quantities of 2,6-dimethoxybenzoic acid are also available from the firm.

FULLER EQUIPMENT

for the process industries

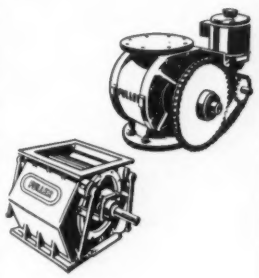


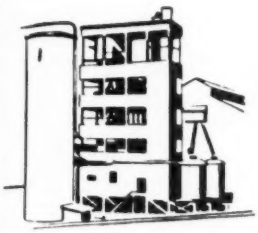
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

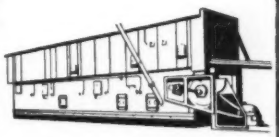
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





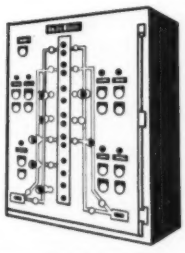
Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



Fuller-Material-Level Indicators signal audibly and visibly when materials reach a predetermined high or low level. Controls conveyor motors, valve circuits, etc.

Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



Fuller equipment is designed to help give you maximum efficiency at minimum cost. Send today for more detailed literature.

"See Chemical Engineering Catalog for details and specifications."

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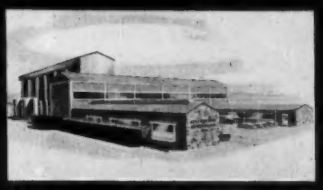

Mexico — Citric acid plant for Química Mexama S.A. Drawing includes proposed future expansion.

Holland — Complete 100,000 bpsd "grass roots" refinery constructed for Esso Nederland in the vicinity of Rotterdam.

Taiwan — 600 bpsd sulfuric acid alkylation plant for Chinese Petroleum Corp., Kaohsiung.

Spain — Fractionatio unit for Empres Naçional Calvo Sotelo

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Chemical and petroleum producers in search of international profits are turning their engineering and construction projects over to Badger in growing numbers. To date, Badger has helped clients make their money talk in thirteen languages.

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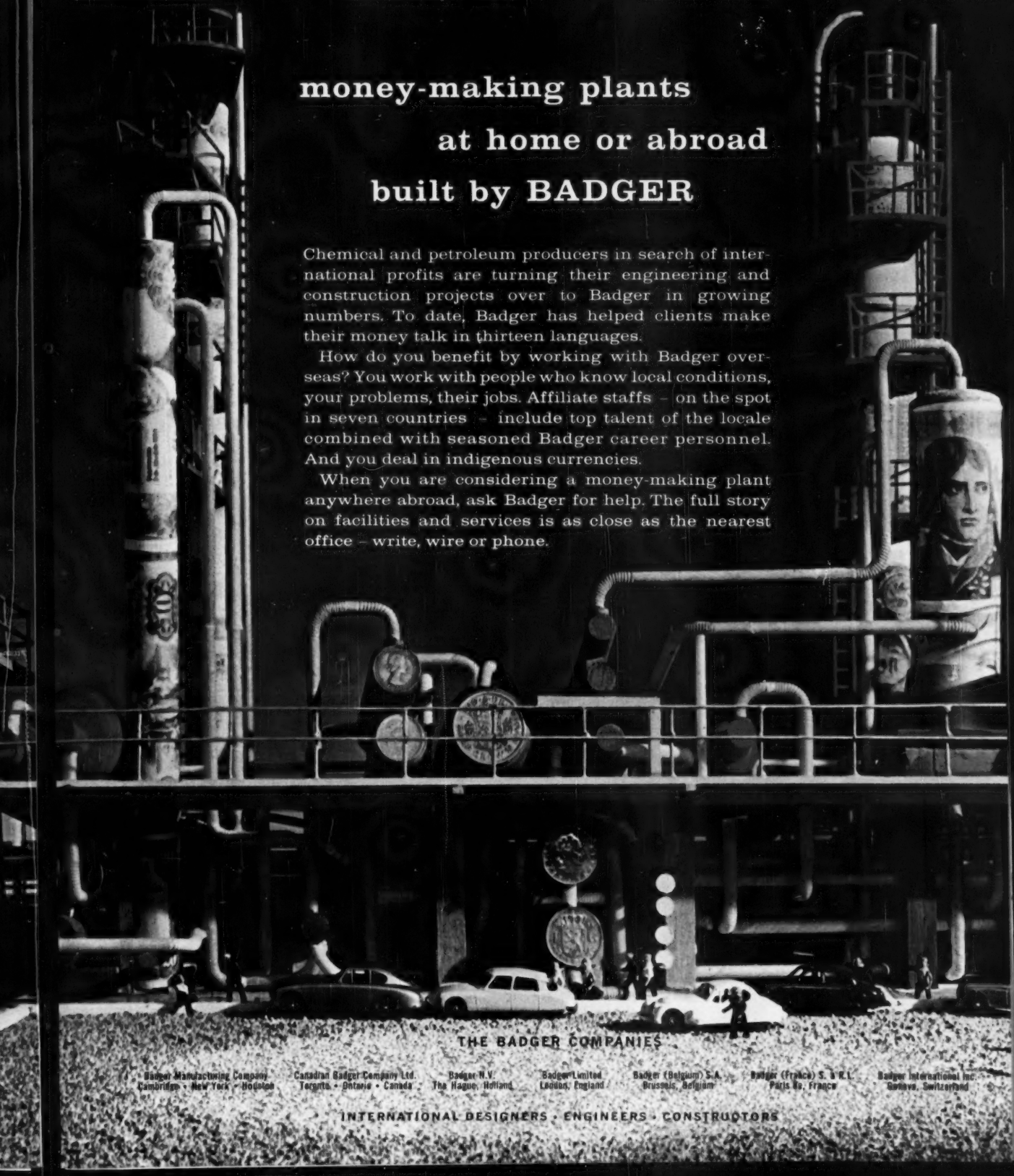
When you are considering a money-making plant anywhere abroad, ask Badger for help. The full story on facilities and services is as close as the nearest office – write, wire or phone.



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CHEMICAL MATERIALS FOR INDUSTRY

G61-6

HERCULES

Pushbutton Powders Next?

New twists in powder aerosol formulations and valves draw cool reaction from packagers. Reason: limited markets.

Aerosol packaging of powders is drawing new interest from marketers of items such as foot powders, tooth powders, insecticides and talcums. While a number of developments in the last few months indicate that many of the technical difficulties of packing powders in the pressurized dispensers have been licked, limited product appeal and industry apathy may delay a commercial surge.

Some powder aerosols are currently being marketed, but they are mainly high-priced materials—e.g., pharmaceuticals—sold in limited quantities. Due to the development of a system that overcomes some of the problems (mainly agglomeration and caking of the material, valve clogging, and limitations in the amount of product that can be loaded) associated with the powder aerosols the industry may break through into high-volume, low-cost items.

One reason for an optimistic outlook is the disclosure by Union Carbide Chemicals Co. of a system that overcomes some of these technical problems (*CW Technology Newsletter, May 20*). Carbide has: (1) prevented agglomeration and caking by stabilizing the suspension of powder in the propellant; (2) developed a new valve to accommodate such a suspension.

Solution of the first problem, agglomerating and settling, was achieved by adding a free-flowing bulking agent such as Monsanto's Santocel 54. The amount of bulking agent added is approximately equal to the calculated volume of the voids between the powder particles.

Union Carbide's system also calls for further additives—small amounts of an inert liquid (mineral oils and fatty acid esters) to lubricate the powder particles and the valve and a small amount of detergent to aid the oil in coating the particles.

A typical formulation of a powder aerosol would be approximately (by weight) 22.1% active powder; 1.7% bulking agent; 72.2% propellant; 2.8% inert liquid and 1.2% surfactant.

Carbide says this formulation gets 30-35% of active powder in the product; maximum has been 10-15% in existing aerosol powder formulations.

A number of formulations have been worked out by Carbide. For a tooth powder, for instance, it suggests: 2.92% dicalcium phosphate (anhydrous); 26.34% dicalcium phosphate dihydrate; 1.54% Santocel 54; 2.43% Klearol; 0.69% Span 85, 0.39% Tween 80; 65.68% Ucon Propellant 12/11.

The valve Carbide has developed is being manufactured under a license by several of the large valve-making companies, including Risdon and Precision Valve. Like the rest of the process, it is being submitted for a patent. Most of the valves offered for powder aerosols in the past have been modifications of liquid-dispensing units, and Carbide researchers claim that the baffles, turns and corners that reduce the cooling effect of the propellants in these valves also contribute to buildup of powder. Hence the need for its specially designed powder unit.

It May Work—But: To gauge the significance of the UC development CHEMICAL WEEK surveyed key aerosol industry executives, found the reaction more ho-hum than gee-whiz.

The attitude seems to be that while the achievement is technically interesting, it doesn't provide a sure market for even a perfected powdered product.

Typical of this response is that of Peter Clapp, vice-president of Western Filling (Los Angeles). Says Clapp, "It's very easy to dispense powders without using aerosols—and at less cost, to boot. The high degree of consumer acceptance of conventional powder-dispensing techniques means but comparatively little business for aerosol people."

Sylvan Lesko, president of Par Industries, another contract filler, sees only a limited acceptance of powder aerosols. Graphite spray lubricants, corset slip-on powders and the like are among the items he feels could be packed—but they are low-volume sales items.

Tony Major of Aeropak also describes the development "as very interesting," but says his company is taking a "wait and see" attitude. In the past, he says, the powder aerosols that have been marketed have been plagued by lack of a valve that would operate satisfactorily under intermittent spray (stop and start) conditions.

Major also points out that fillers hold a precarious position in the industry, which makes them reluctant to try brand-new items. Although fillers don't manufacture components, they are often blamed if the finished unit fails in any way.

Doug Atlas, vice-president of contract filler George Barr (Chicago), tells CHEMICAL WEEK his firm is also conservative about the potential of powder aerosols. He too feels they have a very limited market—unless something popular comes along in the food field. He is also concerned about valves, is unconvinced by Carbide's claims to have solved the problem. Until his company has had a chance to evaluate the new rash of special powder valves, he's reserving judgment about the future of powdered products.

Other industry sources brought up the matter of economics, pointing out that the quantity of powder fillers put into a can will be only 10-50% of what can be put into the same size box. A possible solution of this

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To keep pace with Ohio's dynamic growth, the state's eight investor-owned electric power companies will spend three billion dollars in the coming decade to double capacity. As much new generating capacity will be provided in the next ten years as was built in the past seventy-five.

If you are seeking a plant site, these facts are important for two reasons. First, this is solid indication of the confidence electric utilities have in Ohio's future growth. Second, you can be sure there will be plentiful, dependable electric power for your industry. Today, Ohio's generating capacity is 10.6 million kilowatts, and this state is the number one user of electric power in the nation.

Additional information detailing vital plant site factors is yours for the asking. Send the coupon below on your letterhead for two new booklets of solid facts: Statistical Abstract of Ohio: 1960 and Ohio, The Growth State.

Koder M. Collison, Director
State of Ohio, Department of Industrial and Economic Development
700 Bryden Road Columbus 15, Ohio

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—using high-potency powders—might mean troublesome product reformulation.

If there is any swing to powder aerosols it will be, in the opinion of the majority of those queried, toward such products as agricultural chemicals, pharmaceuticals and cosmetics.

Union Carbide, however, is convinced it has solved many of the technical problems connected with powder aerosols. Its main job now: to prove to the chemical industry that these problems were worth solving.

Showcase for Plastics

At last week's National Plastics Exposition in New York these new products were showcased:

• Cimastra Division of Cincinnati Milling Machine Co. displayed a glass fiber-reinforced plastic electrical laminate for printed circuits, which it says is competitive with paper-base phenolic circuit boards. It's called Cimclad printed-circuit board.

• York Industrial Plastics (York, Pa.) showed samples of thermosetting plastic extrusions (e.g., phenolics) that it has begun turning out in limited quantities. The company will offer the extruded thermosets as rods, and tubings at a cost reportedly one-half to three-quarters that of equivalent laminated items.

• An expandable polystyrene strand was shown by Dow Chemical. It's intended for use as a packing and cushion product. The material looks like spaghetti, has negligible water absorption and no odor. It's priced at 37¢/lb., comes in three sizes. All formulations expand to approximately 20 times their unfoamed bulk density, according to Dow.

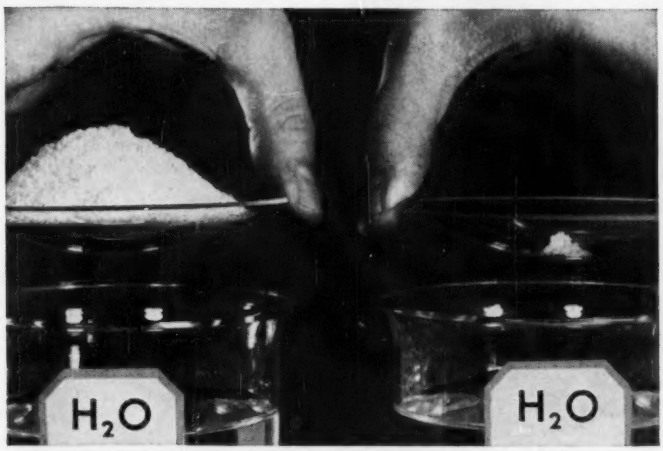
• A thermoplastic resin called Poly-Eze, which is a copolymeric material capable of providing elasticity without the use of plasticizer, was given considerable buildup by Spencer Chemical. It's based on low-density polyethylene, can be filled with low-cost materials in quantities up to 90%. Density is 0.932, melt index is 2.

• Vyon, a porous, high-density polyethylene, was shown in various applications such as noise suppressors and fluidized-bed conveying by Porous Plastics Ltd. (Dagenham Dock, Essex, England).

3M COMPANY CHEMICALS

THE RAW MATERIALS OF PROGRESS

Why is one of these surfactants up to 100 times more powerful?



Because the 3M Brand Fluorochemical Surfactant combines a highly surface-active, stable fluorocarbon tail with a solubilizing group, it functions at much lower concentrations than conventional surfactants. For example: .001% by weight of the 3M Surfactant (shown above right) will reduce the surface tension of water to 30 dynes per cm. It would take 100 times that weight of a typical Alkyl Benzene Sulfonate (left) to do the same job! 3M Surfactants offer at least 10 dynes per cm. lower surface tension than any other surfactant. And their leveling action is exceptional: when used as a wax leveling agent, just 10 grams of a 3M Surfactant makes 40 gallons of wax solution.

The secret of the high surface activity of 3M Surfactants: the combination of a stable fluorocarbon tail of extremely low surface energy with a solubilizing group that is specially designed to aid in the migration and orientation of the molecule. This enables surface properties to be achieved at minimum solution concentrations. 3M Surfactants easily reduce surface tensions that defeat conventional surfactants. Just one example: the interfacial tensions between inorganic acids and organic liquids. For more information see the "profile" to right, then mail us the coupon below . . .

3M Chemical Division, Dept. KAK-61
MINNESOTA MINING
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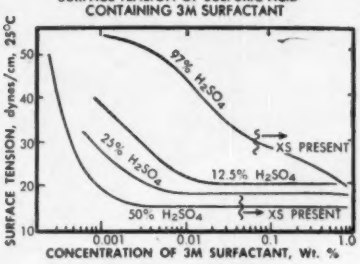
PROPERTIES PROFILE

ON 3M BRAND FLUOROCHEMICAL SURFACTANTS

Chemical and Thermal Stability. Exceptional stability in the presence of heat, strong acids and bases, oxidizing and reducing agents can be built into 3M Surfactants. In some cases they resist temperatures of 700° F. **Strong acids:** some 3M Surfactants can be refluxed for 48 hours in 50% H_2SO_4 with no evidence of decomposition or change in surface tension. **Bases:** 3M Surfactants have been used in 50% Sodium Hydroxide at 150° F. **Oxidizing agents:** 3M Surfactants withstand 90% Hydrogen Peroxide. **Reducing agents:** tests show no damage to certain 3M Surfactants even when used in 95% Hydrazine.

Surface Activity. The extremely low surface energy of the fluorocarbon chain of a 3M Surfactant allows attainment of **surface tensions** of less than 18 dynes/cm. . . . at least 10 dynes/cm. lower surface tension than any other surfactant.

SURFACE TENSION OF SULFURIC ACID CONTAINING 3M SURFACTANT



And the unprecedentedly low concentrations avoid many of the bad side-effects that arise when working with conventional surfactants. (See diagram above.) (H_2SO_4)

3M Surfactants reduce **interfacial tensions** easily . . . even between inorganic acids and organic liquids that defy conventional surfactants. In actual test, the interfacial tension between 1 molar Sulfuric Acid and Decane has been lowered from 48 to 12 dynes/cm. by the addition of only 0.02% by weight of 3M Surfactant to the acid phase.

Excellent **leveling action** without moisture sensitivity is possible in paints, waxes, coating materials of many types, because 3M Surfactants reduce surface tensions at very low concentrations. In the matter of **foaming power** they offer a distinct advantage by being able to form stable foams in liquids such as organic liquids, strong acids, bases, oxidizing and reducing agents which destroy conventional organic surfactants. They effectively produce stable **emulsions** of small particle size.

Concentration Requirements. 3M Surfactants function at much lower concentration than conventional surfactants. Therefore, .001% by weight of a 3M Surfactant will reduce the surface tension of water to 30 dynes/cm. It would take .1% by weight of a typical Alkyl Benzene Sulfonate to do the same job!

CHEMICAL DIVISION

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Sohio's new Solar Urea meets your requirements for any application

Now there is a chem-grade urea that can meet all of your requirements for purity and performance. Sohio's new Solar Urea sets new standards of quality for the most demanding processes. At the same time, you profit from the easy-handling benefits of the prilled form. If color, clarity or consistency is your problem, Sohio wants you to know more about the high purity and bag-after-bag uniformity of new Solar urea.

Check a sample of Solar Urea. Write today.

SOHIO

SOHIO CHEMICAL COMPANY

Agent for Solar Nitrogen Chemicals, Inc.

Fort Amanda Rd., P.O. Box 628 • Lima, Ohio

Phone CApitol 5-8015 or wire (TWX call letters LIMA O 497-U)

1-1

Sohio distributors of Solar Urea: T. H. Baylis Company, Providence, Rhode Island • The Chemical Supply Company, Neenah, Wis. • The Globe Chemical Company, Inc., Cincinnati, Dayton and Columbus, Ohio; Louisville, Ky. • The C. P. Hall Company of Illinois, Chicago 38, Ill. Inland Chemical Corporation, Toledo, Ohio • Ivey Chemical Company, Inc., Greenville, S.C. • Lehigh Valley Chemical Company, Easton, Pa. Maryland Chemical Company, Baltimore, Md. • Taylor Salt & Chemical Company, Inc., Charlotte, N.C.

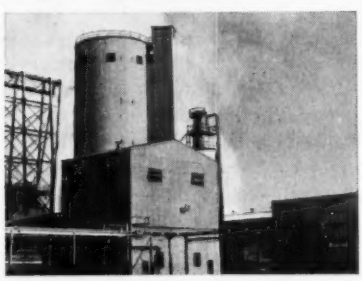
NEW SOHIO METHOD HOLDS KEY TO SUPERIOR UREA QUALITY

HIGH PURITY LEVEL OF NEW SOLAR UREA MEETS COMPLETE RANGE OF APPLICATIONS

LIMA, OHIO — Superior quality is the major characteristic of a process now being used by Solar Nitrogen Chemicals, Inc., in the production of high-purity Solar Urea. This new manufacturing method is the Vulcan-Inventa process with a Stora-Vulcan evaporator. So dramatic is performance that urea users are developing new yardsticks for judging urea quality — particularly for applications in U-F resins, molding powders, textiles and coatings.

Compact system simplifies synthesis

The simplicity of the Vulcan-Inventa process combined with a Stora-Vulcan evaporator virtually eliminates recycle streams and minimizes contamination and biuret formation. The careful selection of materials results in an absence of heavy metals.



Urea melt is transported at low temperatures to retain high purity and to avoid biuret formation. Both concentration and drying are accomplished simultaneously in the unique Stora-Vulcan evaporator. The use of an inert carrier permits evaporation and stripping at low temperatures — again avoiding biuret formation.

Net result

Performance of Solar Urea proves its value in applications previously requiring crystalline urea. Yet Solar Urea is prilled, retains its free-flowing, easy-to-handle properties even during prolonged storage. Further safeguards in storage and packaging facilities mean that Solar Urea comes to you as pure as it was made.

For a production sample of new Solar Urea, write to Sohio Chemical Company, P.O. Box 628, Lima, Ohio.

Emery Adds Four

Emery Industries (Cincinnati) has moved deeper into the polymeric plasticizer field with the development of four new products, tradenamed Plastolein 9722, 9730, 9750 and 9765. Polyester plasticizers for polyvinyl chloride resins, they are derived from products made by Emery's ozone oxidation process.

Plastolein 9722 (development name Emery 3282-D) has a molecular weight (theoretical) of 1,000 and is suggested for use in furniture and automotive coated fabrics, paper wall coverings, vinyl-to-metal laminates and other applications requiring permanence.

Plastolein 9730, now called Emery 3311-D, is said to be the lowest-cost plasticizer offered today, has a molecular weight of 1,100 and is suggested for tapes, shoe construction and coated fabrics. Plastolein 9750 (Emery 3313-D) is a general-purpose, medium - molecular - weight (2,200) semi-resinous plasticizer said to be particularly outstanding in resistance to hydrolysis.

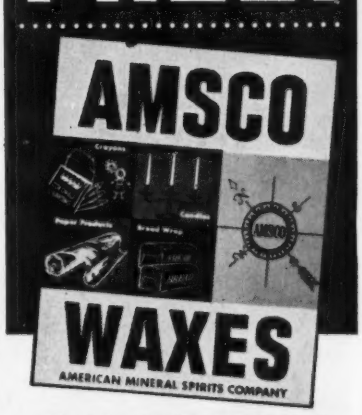
Plastolein 9765 (Emery 3314-D) is intended for uses where medium- to high-molecular-weight polymeric plasticizers are called for. It has a molecular weight of around 3,500, is suggested for refrigerator gasketing, tapes, heavy-duty upholstery, vinyl-to-metal coatings and baby pants. A deodorized grade of Plastolein 9765 (designated Emery 3394-D) is also being offered.

Addition of the new products gives Emery a strong position in the vinyl plasticizer field, especially for products intended for low-temperature applications.

The company now makes such special plasticizers as diisooctyl azelate, dihexyl azelate, dipropylene glycol dipelargonate, a proprietary ester product, Plastolein 9078-LT. Other company products are an oleic acid-base secondary plasticizer, tetrahydrofurfuryl oleate and three epoxy plasticizers based on unsaturated fatty acids and vegetable oils.

In addition to unveiling the four new plasticizers, Emery last week said that it was dropping the price of azelaic acid (source of many of its plasticizers) 3¢/lb., to 37¢, as a result of lower operating costs achieved through increased production.

FREE!



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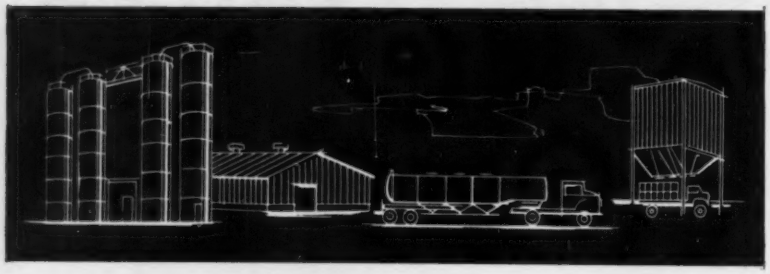
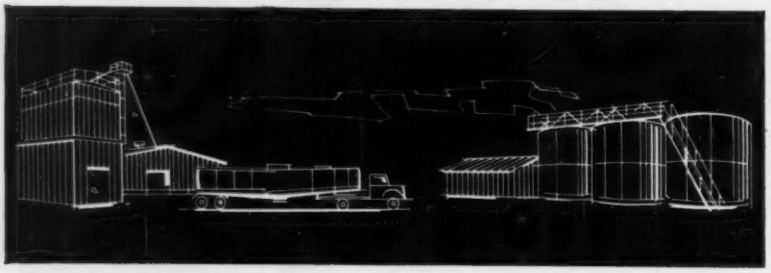
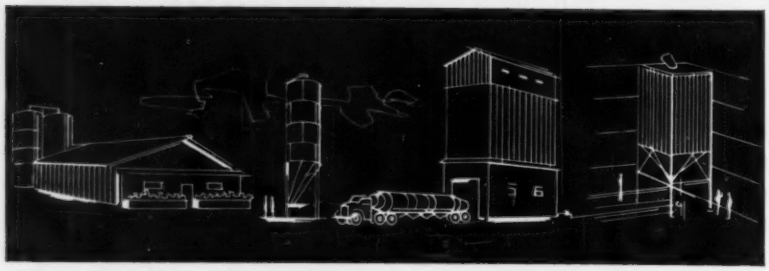


LINE OF TANKS, BUILDINGS



AND TRAILER TRANSPORTS FOR



BULK STORAGE AND HANDLING

Handling dry flowables in bulk offers many advantages. But tanks, buildings and transports are costly investments when custom designed and fabricated. That's why so many companies are converting with Butler bulk storage and handling equipment.

Butler tanks and Butler buildings are pre-engineered. They simplify the job of creating the basic structures. Bolt-together assembly of standardized components speeds construction, provides easy expansion and keeps maintenance and insurance costs to a very minimum.

The tanks can be furnished in sizes to fit any space or volume requirement. Butler buildings are available in post-free, rigid frame sizes up to 120′ wide. Butler pneumatic trailers have exclusive P-D* delivery systems that unload even hard-to-handle flowables with unusual speed and efficiency.

Whatever your bulk storage and handling needs – tanks, buildings or transports – Butler has the economical solution. Write today for details.

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Industrial Bulk Sales Division

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In Canada contact Butler Manufacturing Company (Canada) Ltd., 3455 Queen Elizabeth Way, Burlington, Ontario

EXPANSION

Building in Britain: International Flavors & Fragrances (New York) will build a new plant and headquarters for its British subsidiary in Enfield, England. Separate flavor and perfumery production units will each have research laboratories. Completion is set for mid-'62.

•

Plastics Plant: Raritan Plastics Corp. (Oakland, N.J.) has completed a new, 25,000-sq.ft. plant—a doubling of its plastics molding facilities.

•

Tide in Mediterranean: A Lebanese holding company, Sannin SAL, will manufacture Tide detergents under license from Procter & Gamble AG. (Lucerne). The unit, scheduled for completion within a year, will be Lebanon's first synthetic detergents plant.

•

Aerosols in Egypt: Egycan (Egyptian Can Factories) will supply the first pressurized packaging services in Egypt. The Cairo units will package locally made beauty preparations and later this year will fill Shell and Esso insecticides.

•

Foray in Foam Field: Canadian Hanson & Van Winkle (Toronto) will enter the field of direct application of polyurethane rigid foam. It will be the first Canadian company to custom-apply rigid foam, will use British machinery. First targets will be plant piping insulation and industrial refrigeration.

PRODUCTS

Contact Cement Resin: Shanco Plastics' Chemicals (Tonawanda, N.Y.) has developed a new resin for contact cement. Known as Shanco 740, it is specially formulated for neoprene adhesives used for contact-cementing plastics to wood. It's said to be especially useful for adhesives used for counter tops, floors and work surfaces.

•

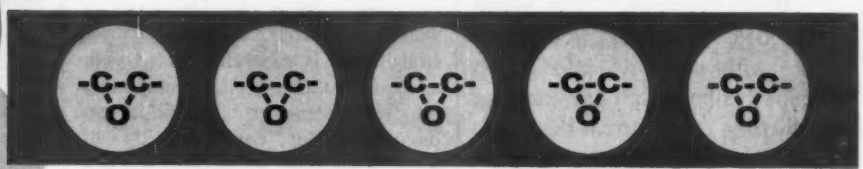
Airless Paint Sprayer: An airless paint spray unit, E-HY 50 Electric Airless, is being manufactured by Balcrank Inc. (Cincinnati, Ohio). It uses a ⅜-hp. electric motor in place of a 1-hp. air compressor normally used for comparable paint jobs. It operates off 115-volt (ac. or dc.) out-

EPOXOL 9-5

the new high oxirane polyepoxide with

REACTIVITY-PLUS

The new modifier for polymer systems, averaging over five epoxide groups per molecule.



LEWIS ACIDS → POLYETHER

DI- OR POLY-BASIC ACIDS OR ANHYDRIDES → POLYESTER

POLYAMINES → POLYMERS

SPECIFICATIONS

EPOXOL 9-5

Oxirane Oxygen	9% Min.
Iodine Value	5 Max.
Gardner Color	Less than 1
Gardner Viscosity @ 25° C.	V Max. (8.8 poises)
Saponification No.	176 Max.
Acid No.	0.3 Max.
Absorptivity @ 2.9 Microns (Corrected for Background)	0.020 Max.
Specific Gravity 25° C/25° C.	1.020 ± .007

Epoxol 9-5 is a completely new reactive polyepoxide containing 9% oxirane oxygen. It is capable of forming polymers, either alone or in combination with many other resins including—alkyds, polyvinyl halides, modified phenolics or bisphenol-epichlorohydrin type epoxy resins. Epoxol 9-5 can be polymerized to form several types of polymers with wide varieties of physical properties.

The improved compatibility of Epoxol 9-5, combined with its high degree of reactivity, make it a good prospect to open new markets and extend the useful range of many resin systems.

Check the specifications at the left and use the coupon to obtain a sample or more information on Epoxol 9-5.

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TP-6

Mixed Hydride Systems give LITHIUM ALUMINUM HYDRIDE New Reduction Selectivity

MHI's brochure,* "The Mixed Hydrides," will bring you up to date with complete information about this important development in hydride chemistry. It describes and illustrates how the selectivity of this powerful, ether soluble reducing agent is greatly expanded by combining other reagents with it to form **mixed hydride systems.**

If you are working in the field of organic synthesis, perhaps in pharmaceuticals or natural products, you should have a copy of this brochure.

This new development increases the usefulness of lithium aluminum hydride considerably beyond aldehyde, ketone, ester and nitrile reductions. Simple and safe to use, reactions are rapid yet easily controlled in conventional equipment at room temperature and normal atmospheric pressure.

*By Mark N. Rerick, Univ. Notre Dame

PIONEERS IN HYDRIDE CHEMISTRY

M H I *Metal Hydrides Incorporated*

212 CONGRESS STREET
BEVERLY, MASSACHUSETTS

lets, has an explosionproof motor. Capacity is 5 gal. and fluid pressures range from 1,500 to 2,200 psi. The unit can deliver up to 1 gal. of paint each minute.

•

Pressure-Sensitive Adhesive: Adhesive 215, a nonflammable pressure-sensitive adhesive that air-dries to a clear transparent film in 20-30 minutes, is being offered by Robert Langer Co. (507 Fifth Ave., New York). The adhesive can be removed by soaking in water for 1-2 minutes, then peeling. It adheres to Plexiglas, polyethylene, vinyl, wood, metal, fabrics and glass.

•

Drawing Lubricant: Magnus Chemical's (Garwood, N.J.) new drawing lubricant, Magnus DO-29, is said to combine the durability of chlorinated oils with aqueous cleaning power of water-soluble oils. It can be used straight but is generally diluted with an equal volume of light lubricating oil. The water-dispersible oil is recommended for deep drawing of stainless and alloy steels. Removal can be made by either vapor cleaners or alkaline cleaners.

•

Quick-Drying Solvent: A quick-drying solvent designed for the dry-cleaning industry is being marketed by Stamford Chemical Industries (Jefferson and Meadow Sts., Stamford, Conn.) under the name Fluroclene. The product contains Allied Chemical's fluorocarbon and Stamford's GC-10, is said to have a volatility five times that of perchlorethylene. It's also said to allow 15-minute cleaning cycles.

•

Pelleted Epoxy: Epoxy Products, Inc. (137 Coit St., Irvington, N.J.) is marketing a one-component epoxy bonding material in pellet form. Pellets are custom-shaped, and curing temperatures can be varied from 85 C to 250 C. The company calls the product E-Form pellets.

•

Aerosol Hand Cleaner: An aerosol, waterless hand cleaner with an antiseptic ingredient is being marketed by Ren Plastics Inc. (5422 S. Cedar Road, Lansing, Mich.) under the name Ren Hand Cleaner. The 12-oz. aerosol unit is claimed to have the cleaning power of 2 lbs. of ordinary hand cleaner.

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Our basic position enables us to control the purity of our Sulfur Dioxide from the raw materials we mine to the finished product we deliver to you.

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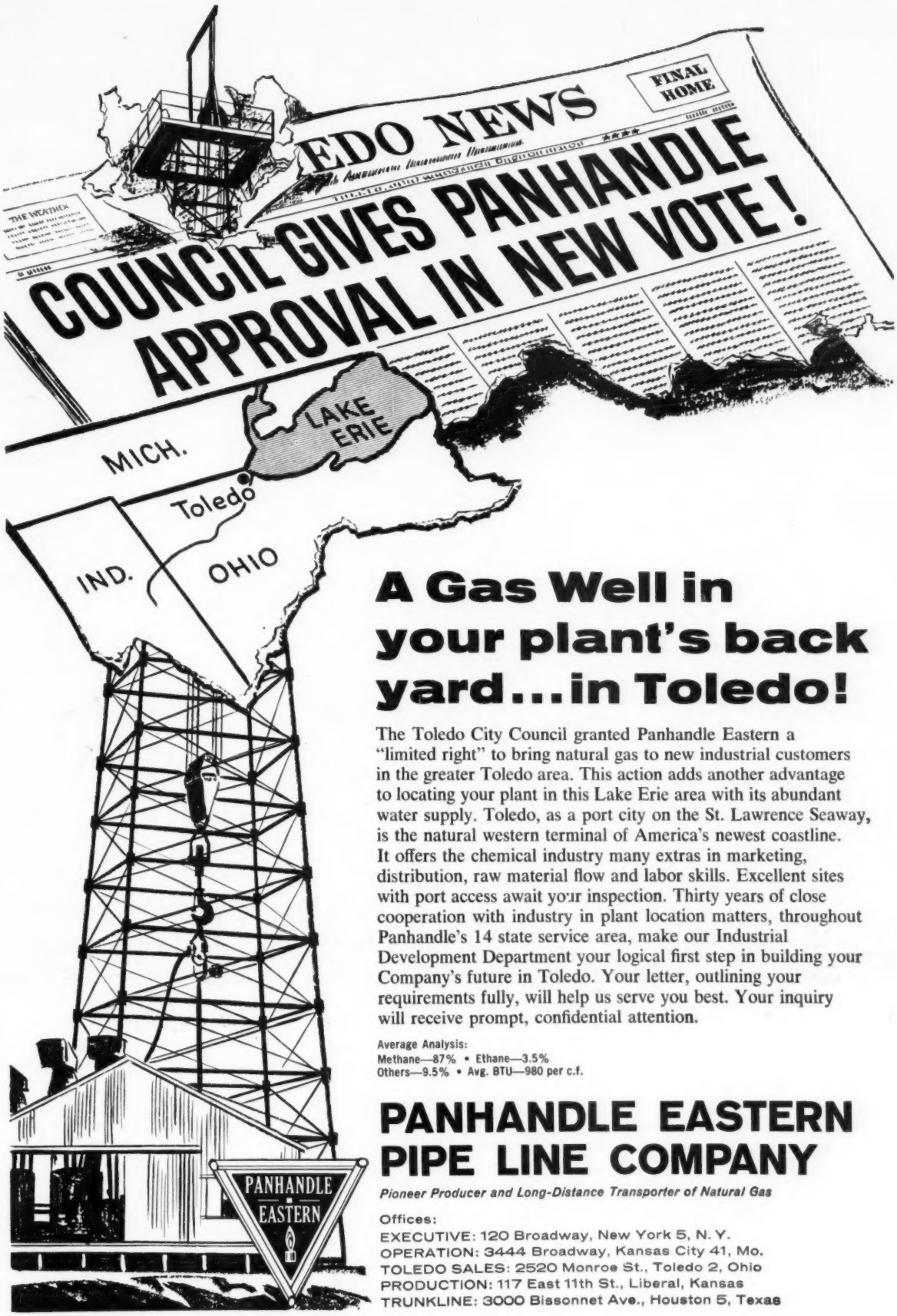

A Gas Well in your plant's back yard...in Toledo!

The Toledo City Council granted Panhandle Eastern a "limited right" to bring natural gas to new industrial customers in the greater Toledo area. This action adds another advantage to locating your plant in this Lake Erie area with its abundant water supply. Toledo, as a port city on the St. Lawrence Seaway, is the natural western terminal of America's newest coastline. It offers the chemical industry many extras in marketing, distribution, raw material flow and labor skills. Excellent sites with port access await your inspection. Thirty years of close cooperation with industry in plant location matters, throughout Panhandle's 14 state service area, make our Industrial Development Department your logical first step in building your Company's future in Toledo. Your letter, outlining your requirements fully, will help us serve you best. Your inquiry will receive prompt, confidential attention.

Average Analysis:
Methane—87% • Ethane—3.5%
Others—9.5% • Avg. BTU—980 per c.f.

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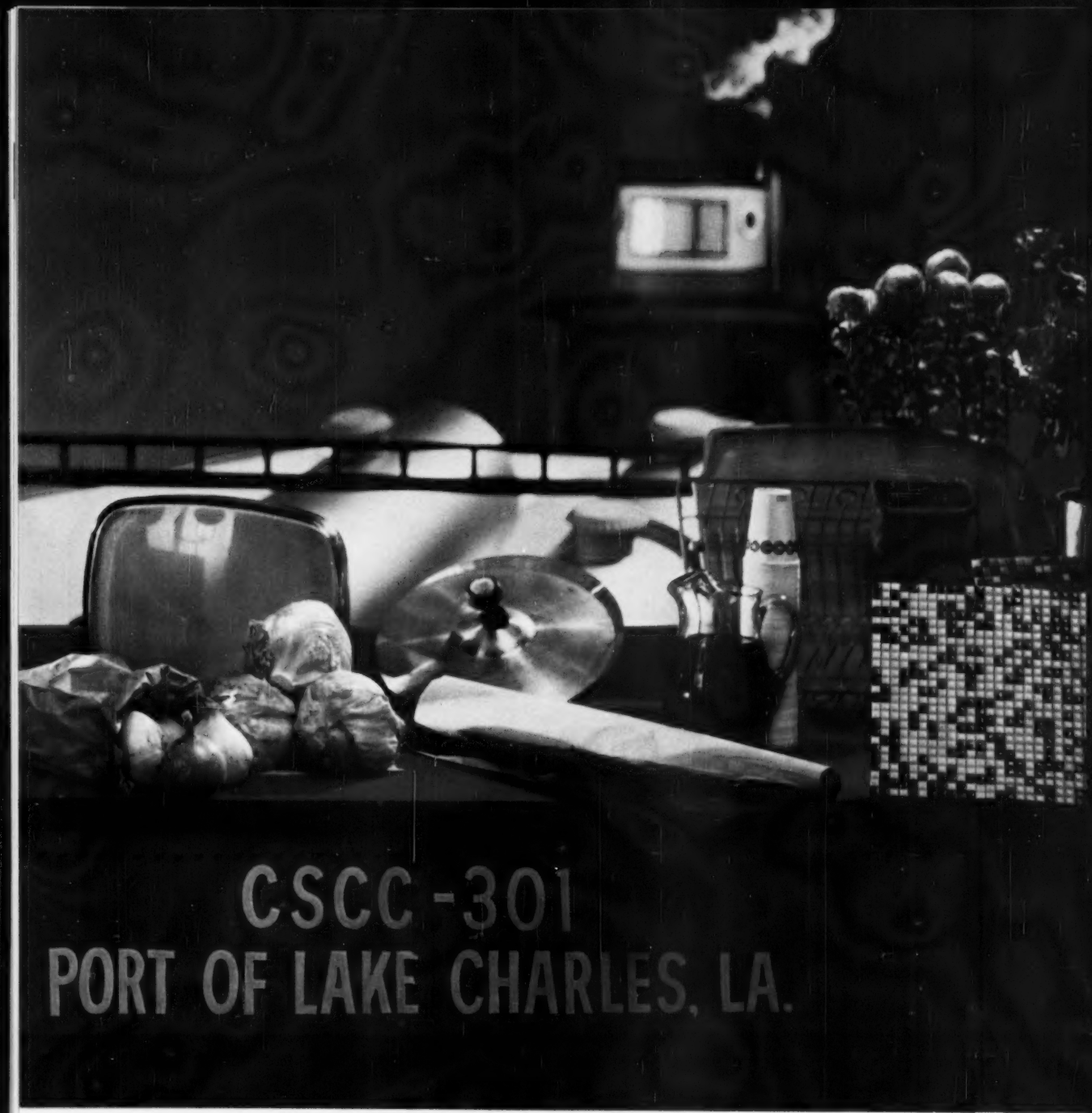

Simulated barge with array of finished products symbolizes Columbia-Southern contributions to chemical transportation and chemical processing.

Quality . . . service . . . delivery . . . economy—all these are part of your value picture when you buy Columbia-Southern Chemicals.

Take delivery. Modern Columbia-Southern barge and rail equipment speeds shipments to your plants at any location—on time, as specified. In fact, some standard chemical transportation practices stem from Columbia-Southern innovations. Two examples: the tank car dome safety platform, and a special tank car lining that prevents metallic pick-up by high concentration caustic.

Customer oriented advances like these extend through all Columbia-Southern activity, from sales call to order processing to invoicing. That's why so many leading purchasers in most chemical-using industries like doing business with Columbia-Southern. You will too.

Chemical Division, Pittsburgh Plate Glass Company, One Gateway Center, Pittsburgh 22, Penna. Offices in principal cities. In Canada: Standard Chemical Limited.

columbia | southern chemicals

CHEMICAL DIVISION

PITTSBURGH PLATE GLASS COMPANY

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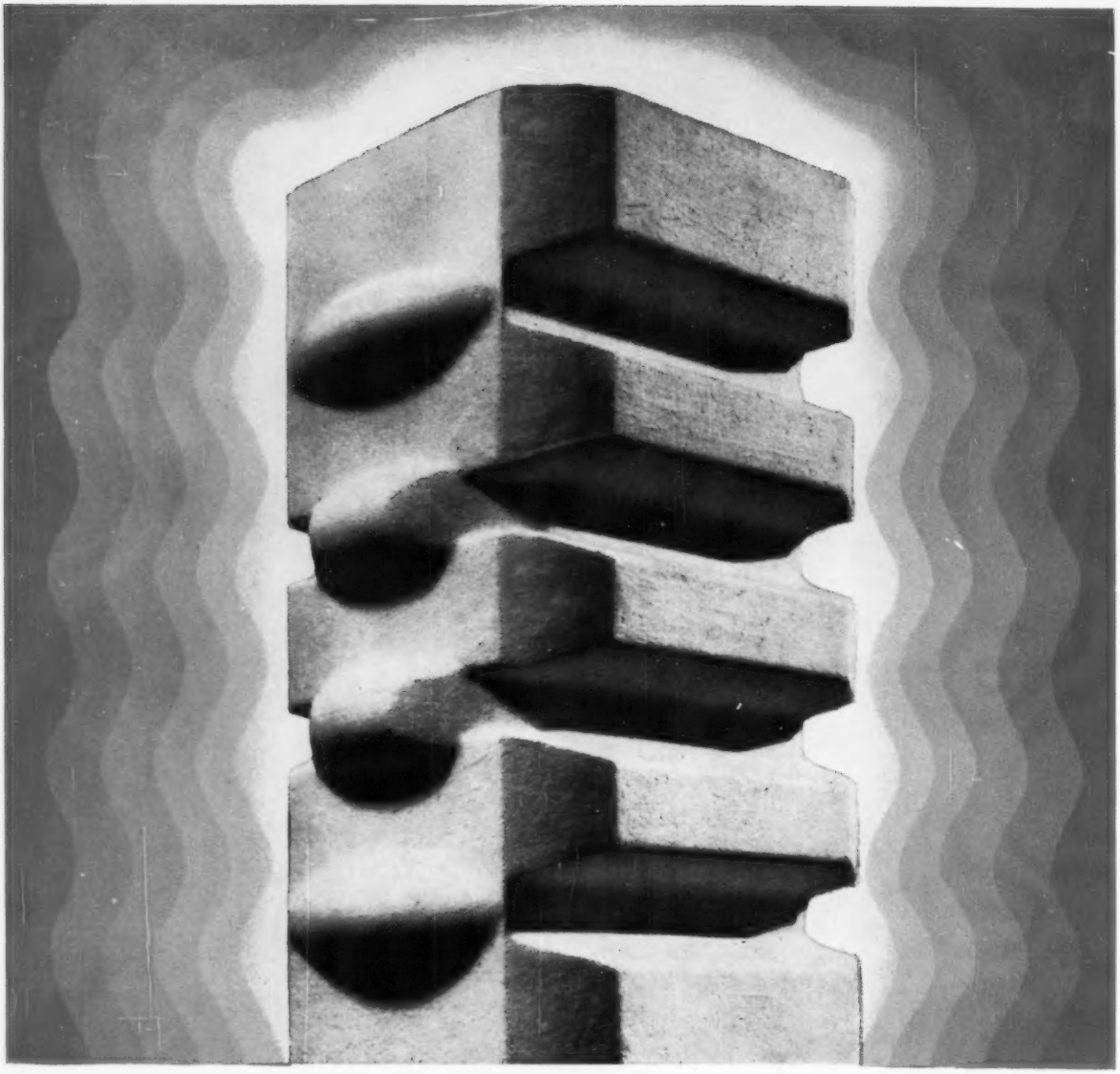
Reinforcing Pigments • Calcium Chloride • Hydrogen Peroxide
Muriatic Acid • Calcium Hypochlorite • Titanium Tetrachloride



Harbison-Walker creates new super refractory . . . by mixing imagination with Alcoa Aluminas

By using the full potential of ALCOA® Aluminas, Harbison-Walker Refractories Company has developed a remarkable mullite-bonded corundum refractory that is free of the common shortcomings of other super refractories.

Called Korundal XD, it combines extraordinary strength, high density and low porosity. It may be formed into intricate shapes. It is singularly resistant to destructive furnace atmospheres, abrasion and slag attack. And, significantly, it is reasonably priced.

Proof of performance? Korundal XD shows no subsidence in the 25 psi, 3,000°F hot load test after 100 hours. Additional tests showed subsidence of 0.2 per cent after 24 hours at 3,100°F, only 2.0 per cent after 24 hours at 3,200°F, and no spalling loss in the ASTM panel spalling test after 3,000°F preheat.

Korundal XD has been used successfully as skid rails in slab heating furnaces and enamel melting furnaces, as kiln furniture in operations too hot for cordierite and silicon carbide, and in checker chambers where very high temperatures are encountered. Promising new applications include vertical lime kilns, vanadium pentoxide fusion furnaces, combustion areas of carbon black furnaces, electric furnace roofs and tapping holes of iron blast furnaces. Clearly, Korundal XD is destined for the super blast furnaces of the future.

ALCOA does not make refractories, but we do supply in unlimited quantity the quality aluminas that make modern refractory performance possible. We shall be happy to send more information. Please write to ALUMINUM COMPANY OF AMERICA, 706-F Alcoa Building, Pittsburgh 19, Pa.

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ALCOA CHEMICALS

ALUMINUM COMPANY OF AMERICA

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Technology
Newsletter

CHEMICAL WEEK
June 17, 1961

Watch for American Cyanamid to move into the urethane elastomer field. In an unusual disclosure last week, the firm reported it is "in the final stages" of developing a process to make urethane prepolymers. The process under investigation is scheduled to turn out a single product that will permit the processor to make an elastomer of varying degrees of hardness by changing the curative. Cyanamid plans to offer five different curatives.

However, the firm reports it has a long-range research program under way on urethane prepolymers, says it will eventually be bringing out other new ones.

•

Sohio chemical is bringing out a new form of urea. It's called Solar urea, is said to retain the advantages of free-flowing prills and yet meet specifications so rigid that it can be used in places where crystal urea previously had been demanded.

The newcomer is made by the Vulcan-Inventa process, in combination with a Stora-Vulcan evaporator installed at Solar Nitrogen's plant (Lima, O.).

The Vulcan-Inventa process employs an absorption column to separate reactants, ammonia and carbon dioxide (*CW, Nov. 12, '60, p. 74*). By keeping out all recycle streams, says Sohio, product purity is maintained. The Stora-Vulcan evaporator concentrates and dries the product in one step. And the product goes from there to the prilling tower without additional handling.

•

A cost-cutting sea-water desalting process using a freezing method developed in Japan will soon be offered in this country by Clark Brothers Co., a division of Dresser Industries (Olean, N.Y.). Donald Other, consultant to the Office of Saline Water, U.S. Dept of the Interior, described it this week at a plenary lecture at Dechema, German chemical society meeting held in conjunction with Achema, the European convention of chemical engineering at Frankfurt. He reports costs of the process at 35-45¢/1,000 gal. of fresh water produced. For a 1-million-gal./day plant, costs were figured at below the "less than $1/1,000 gal." costs claimed for comparable-size plants using other desalting processes. Objective of all processes is 40¢/1,000 gal., the current potable-water cost.

Clark's process, developed by Shuji Umano, chief chemical engineer of Japan's Government Chemical Industrial Research Institute, achieves low costs because of basic process simplicity, relatively small unit size. The process operates at near atmospheric pressure and low temperatures. Heat transfer is accomplished by direct contact between the water and oil (the heat-transfer fluid), which eliminates scale on heat-transfer surfaces.

Japan's stake in water desalting is in the production of low-cost salt rather than fresh water. Japan, which has no salt, must import it because techniques such as solar evaporation are impractical. A 52,000 gal./day plant using the Umano process is already in operation in Japan. Salt from this plant is added to sea water to increase the concentration of brine feed for electrolytic cell operations.

•

New for waste cleanup: a corrugated, polyvinyl chloride trickling filter. Mead Corp., testing it at its 500-tons/day kraft paperboard mill in Rome, Ga., says the new filter design has high efficiency, is best suited to mills with a limited land area and a large volume of wastes. Conventional rock filter would have cost $2 million; PVC unit cost: $1.25 million.

The 370,000 lbs. of PVC used provided the largest single order that B. F. Goodrich Co. (Marietta, O.) ever received. And a Mead engineer says he is being conservative in figuring that two or three similar units will be installed by the paper industry each year. Another possible market application: municipal waste-treatment plants. PVC (rather than polystyrene or polyethylene) has been selected because it is comparatively resistant to turpentine in wastes and high-effluent temperature.

•

Selas Corp. will build the big hydrogen plant for Tidewater's Isocracking plant at Avon, Calif. Refinery products and natural gas will be steam-reformed to provide a whopping 50 million cu.ft./day of hydrogen for the 20,000-bbls./day Isocracking plant.

Gas will be reacted catalytically with steam at 1450 F and 175-lbs. pressure. A system for recovery of waste heat, integrated with the furnaces, will generate 214,000 lbs./hour of steam.

•

Beryllium oxide is the latest candidate as a ceramic fiber material (*CW, April 29, p. 61*). National Beryllia Corp. (Haskell, N. J.) has received a 12-month research and development contract from Materials Central, Aeronautical Systems Division, U. S. Air Force.

The firm has been working on the project privately for several months. Goal: to make thin fibers of single crystals of the oxide, which would be used as reinforcing agents for plastics or inorganic materials, structural materials for high-temperature jobs in rockets and planes.

Beryllium oxide's qualification's for the job: a melting point of 4650 F and a promise of permitting fibers with tensile strengths up to 2 million psi.

•

The AIChE is publishing a "Chemical Engineering Thesaurus" containing 8,000 chemical engineering words, compiled according to their generic relationships and with their related terms. The book contains more than 50,000 entries, sells for $5 to members of AIChE, $10 to nonmembers.

Versatile Ashland Oil Process Relieves World-Wide Naphthalene Shortage

MARCH, 1961 . . . OUT OF ASHLAND, KENTUCKY, tank car after tank car, each containing 10,000 gallons of *highest purity* naphthalene, headed for such companies as Reichhold, American Cyanamid, Sherwin-Williams, Standard Naphthalene Products, and Witco. These cars contained the first shipments of naphthalene to come out of Ashland Oil's *patented* Hydrodealkylation Unit . . . *the world's first Hydeal Unit capable of producing naphthalene from petroleum in commercial quantities!* Capacity: from 75 to 100 million pounds of high purity naphthalene per year, enough to eliminate domestic shortages . . . enough to alleviate world-wide shortages!

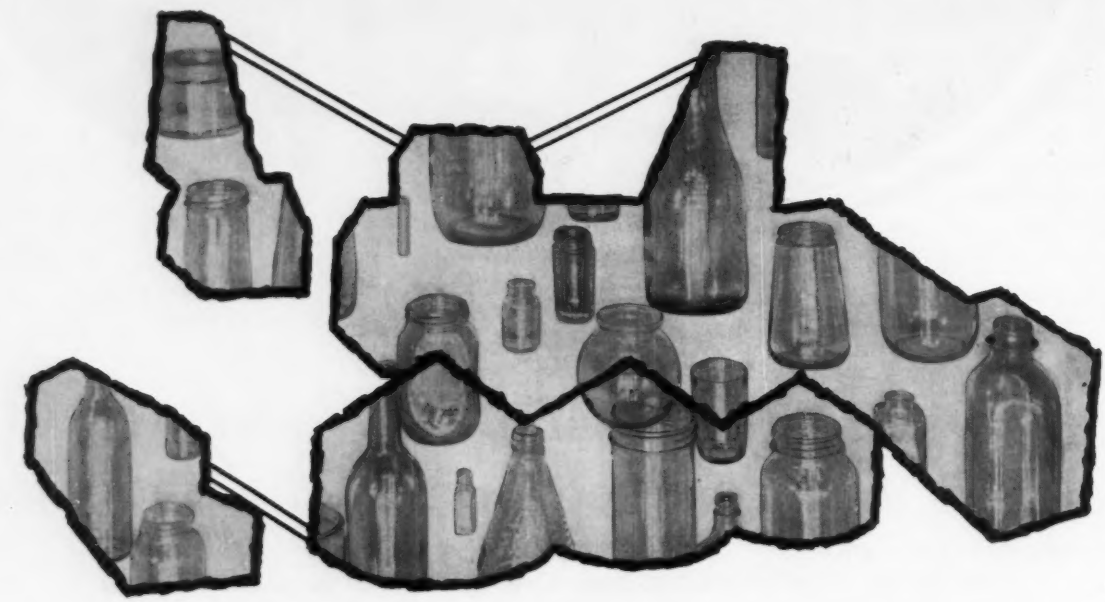
BUT MOST IMPORTANT TO YOU and your operations are the product possibilities offered by Ashland Oil's revolutionary Hydeal Unit through its manufacture of petrochemical "building blocks" used in the Fiber, Plastics, Rubber and Coating Industries. Ashland Oil places its complete facilities at your disposal . . . will work with you on all products and potential uses of these petrochemical "building blocks," including all necessary studies and economic evaluations pertaining to your requirements. Look to the future, and look to Ashland Oil as a prime source of supply for high purity naphthalene, benzene, toluene, xylene, and heavy aromatic concentrates. For complete information, call or write: National Account Department, Ashland, Kentucky . . . Phone: 324-1111.

Ashland OIL PRODUCTS

ASHLAND OIL & REFINING COMPANY
ASHLAND, KENTUCKY

WEST END

advance planning **OF MULTIPLE SODA ASH SOURCES ANTICIPATES INDUSTRY'S GROWING NEEDS**

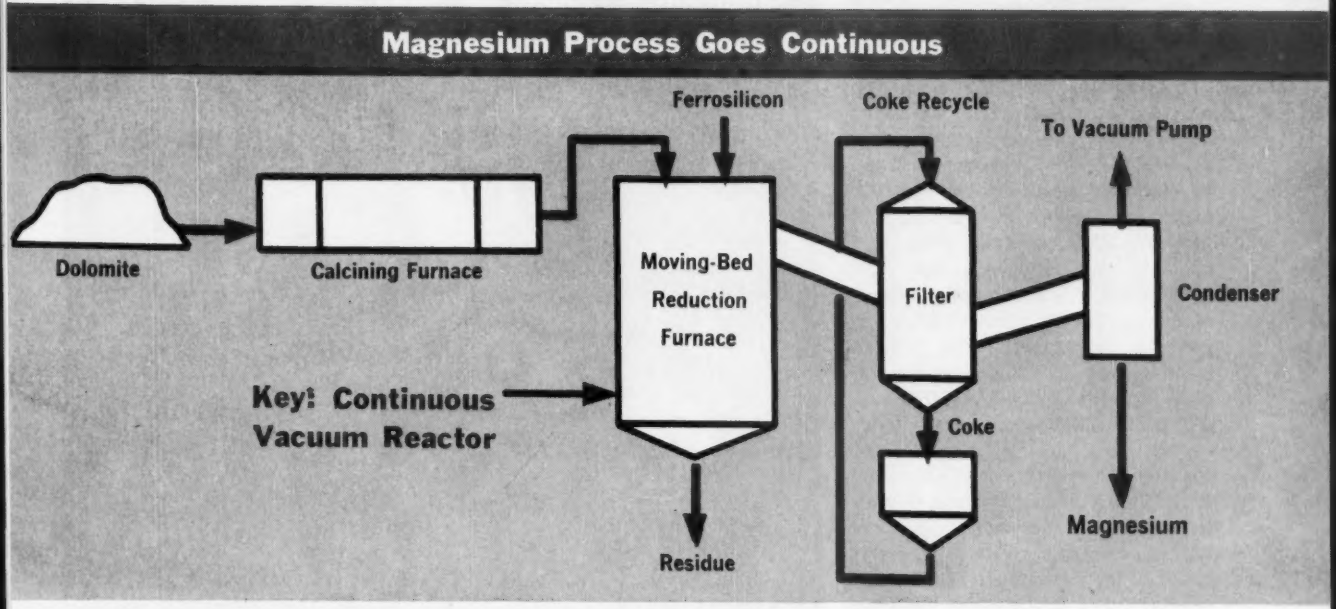


WEST END has new production facilities now under construction at a second natural source in Wyoming. Produced under the same uniform management and controls that have served the requirements of western industry economically and dependably for 36 years, high quality West End soda ash from Wyoming will be available to industrial users in an ever-broadening market.

Stauffer CHEMICALS

WEST END CHEMICAL COMPANY • DIVISION OF STAUFFER CHEMICAL COMPANY

636 CALIFORNIA STREET, SAN FRANCISCO, CALIFORNIA • PLANT: WESTEND, CALIFORNIA



Backing Germany's Magnesium Bid

Engineers at Knapsack-Griesheim AG. (Cologne, Germany) have just completed pilot-plant study of a new, continuous ferrosilicon reduction process for magnesium metal. K-G plans a 3,000-tons/year plant near Cologne —of more than passing interest to the $25-million/year U.S. magnesium industry, since about 10% of its sales stem from exports.

The American producers of primary magnesium are Dow Chemical (Freeport, Tex.) and Alabama Metallurgical Corp. (Salem, Ala.), and a few government suppliers. Dow's 36,000-tons/year plant uses a sea-water electrolysis process that it pioneered decades ago. Alamet's 6,000-tons/year plant runs on a version of the Pidgeon ferrosilicon (batch) process (*CW, June 18, '60, p. 153*). U.S. primary magnesium consumption last year was about 40,000 tons (*CW, June 4, '60, p. 71*).

Alamet's entry into the magnesium business was spurred by fond visions of a big new market in automobiles. Detroit had previously admitted that it shied away from magnesium because there was only one major U.S. supplier. But today—despite the entry of Alamet as the second producer—only about 1 lb. of magnesium gets into each American car. Volkswagen, on the other hand, employs 42 lbs. of magnesium in each of its cars—one reason for Knapsack-Griesheim's development.

Hurdle: The problem in a continuous ferrosilicon process is that it must work under vacuum. Magnesium must be vaporized out of the reactants, then condensed, to yield a high-purity product. Maintaining this vacuum in a large furnace and getting the materials in and out at the same time —and doing all of this economically—is K-G's accomplishment.

Basing claims on data from its 1-ton/day pilot plant, Knapsack says its process will compete with conventional electrolysis in commercial plants of up to 15-tons/day capacity. Presumably the method would be competitive with other ferrosilicon processes.

Here's How: First secret of the continuous process, say the K-G engineers, is in breaking down the raw material dolomite, a calcium magnesium carbonate ore. The lumps are reduced to granules of ⅛-1 in. Ferrosilicon processes usually employ finely crushed calcined dolomite, briquetted with ferrosilicon. The ferrosilicon used in the new process, moreover, can contain up to 3% aluminum. This is cheaper than the conventional ferrosilicon, which has a maximum content of about 1.5% aluminum.

The second key to continuous processing is quick mixing. Dolomite, after it has been calcined to magnesium and calcium oxides, is immediately mixed with the ferrosilicon and fed to the reactor. Since the dolomite is hot, energy savings up to 20% are obtained, says K-G.

The reactor receives an excess of oxides to improve thermal conductivity. Some of this oxide forms a sliding layer between the reacted residue and the furnace lining, thereby boosting reduction.

Reaction Furnace: A moving- or sinking-bed reduction furnace has been worked into the process in place of the conventional furnace. Advantages: (1) the calcined dolomite does not have to be finely ground or briquetted; (2) a variable-temperature filter can be used—this cleans out silicon dioxide, iron and calcium from magnesium vapors, yields a pure metal; (3) better material-handling is achieved, since the reactants travel downward toward the discharge grate, act as support for fresh input.

The reaction takes place under reduced pressure of 20-25 mm. of mercury. The usual ferrosilicon processes require much lower pressures. Double-

charging valves with intermediate containers permit material flow in and out of the vessel with no increase in pressure.

To get the advantages of this higher pressure, the surface material is maintained at an unusually high temperature: 2730-2910 F, instead of 2150 F. However, Knapsack says that the higher temperature permits, for the first time, the continuous production of metals using radiation heating.

Filtration: The conventional method of filtering and thus purifying the vapors is through a layer of hot granular material. But, since this is not feasible in a continuous system, K-G devised a filter of loose, flowing, inert material —coke. This filter layer is continuously renewed at a rate of 66 lbs./hour. It is held at a temperature high enough to keep the magnesium as vapor but not high enough to retain the contaminants in the vapor phase. Thus, magnesium vapors flow through the coke filter, while contaminants condense, become entrained and pass out of the filter with the flow of coke.

Like the reactor, the filtration system is operated at a reduced pressure. This keeps the coke temperature down to 2370 F. Again, double-charging valves and intermediate storage are used.

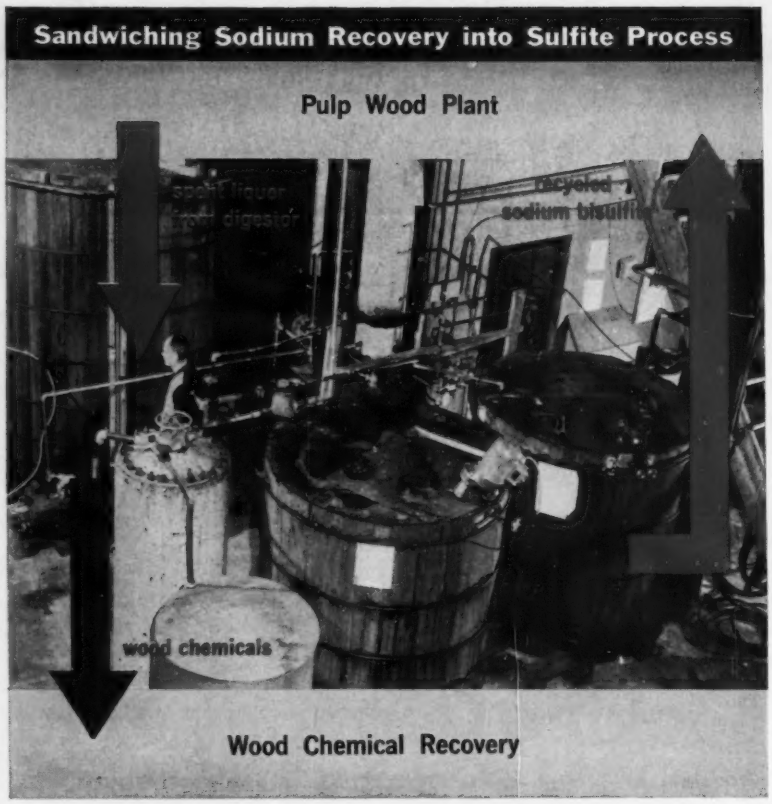
Both in the filter and the reactor, hydrogen gas is circulated for flushing purposes and to prevent premature condensation of magnesium.

The purified vapor is passed to a condenser and is removed from it by the differential contraction of the magnesium and steel. Final vapor composition: magnesium, 99.9%; and manganese, about 0.1%.

Clouded Costs: Though Knapsack won't disclose full cost information on its pilot plant, it is apparent that each pound of magnesium produced requires about 4 kwh. of power. This figure is roughly half of the requirement for magnesium made by electrolysis. But it does not include power to make the ferrosilicon, which can be up to 4 kwh.

The final cost analysis will not be known until K-G gets its commercial plant under way, possibly in '62.

The new German process may cut into U.S. export sales. But long-term predictions for the U.S. magnesium market are bright. And advances in U.S. magnesium technology are sure to come.



Boost for Sodium Pulping

Commercial potentialities of sodium sulfite pulping were enhanced last week as the result of a new sodium recovery process (Abiperm) worked out by Abitibi Power & Paper Co., Ltd., and Pfaudler Permutit, Inc. As in Ontario Research Foundation's new ammonia recovery plan (CW, May 20, p. 55), ion exchange is the major process factor; like the ORF process, Abiperm may well be suitable for ammonium sulfite.

It was described in detail last week to the Technical Section of the Canadian Pulp and Paper Assn., meeting held at Saranac Lake, N. Y. (*CW Technology Newsletter, June 3*). The resin is a sulfonic type called Permutit Q, but details of proprietary equipment designs were not disclosed. Essentially, the process swaps hydrogen for sodium ions, which in turn are recovered as bisulfite (wood pulping compound) by passing a solution of sulfur dioxide in water through the resin bed.

Substitutes for Crusty Calcium: If the resin can be made to handle ammonium and magnesium as well as sodium sulfite, the process can work in a major portion of the current sulfite wood pulping plants. (These, making high-grade white paper for books, tissues, bread wrappings, etc., turn out about 2.1 million tons/year of U.S. pulp and about 1 million tons of Canadian pulp.) The process offers a tool for using straight calcium in the wood-chip digestion step.

Conventionally, papermakers employing the sulfite process go to calcium sulfite for an acidic salt solution to dissolve lignin, sugars, etc., out of the wood fibers. However, a portion of the sulfite always tends to be oxidized in the digester to sulfate, which combines with calcium to form an insoluble precipitate. Processors have long sought to replace calcium with sodium, ammonium, or magnesium, which form soluble sulfate salts.

Nevertheless, the trend away from calcium has been slowed by two factors: (1) the sulfate-soluble salts make serious pollutants when dumped into streams and (2) they're more expen-

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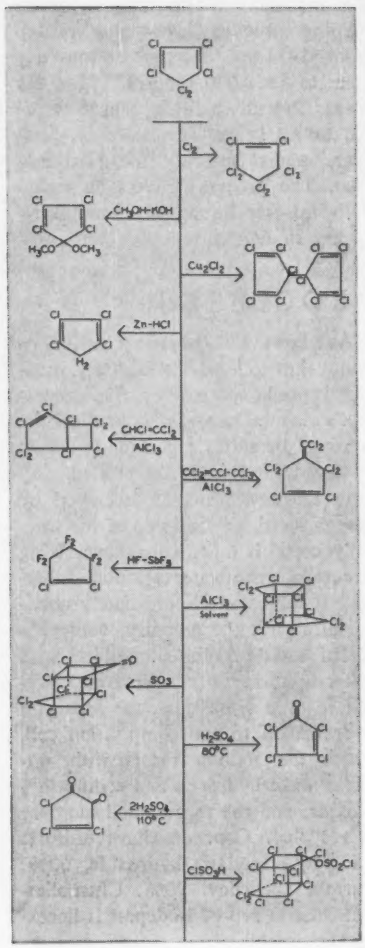

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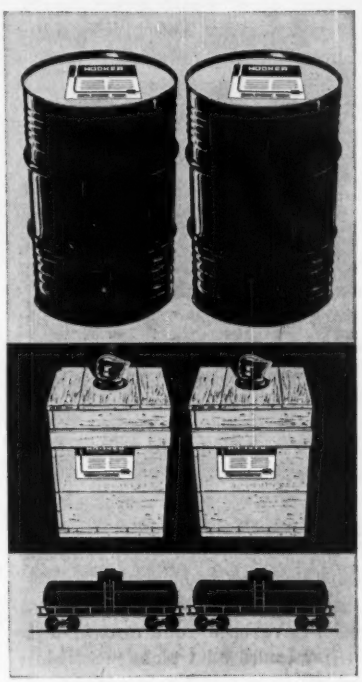

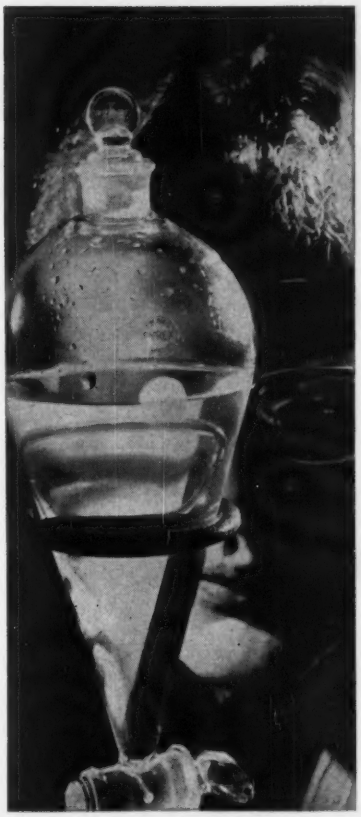

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sive. It's thus doubly important to find an economical means of recovering the base chemicals (sodium, magnesium, ammonium) from the spent digester liquor.

Sodium-Hydrogen Switch: Except for the design details, Abiperm is typical of ion exchange. The raw liquor containing sodium salts is fed to the cation exchanger, and the sodium is retained in the bed. Sodium-free spent liquor is then pumped out to the chemical recovery section, where it may be used as a source of chemicals derived from the lignosulfonates or as fuel.

Meanwhile the resin bed under regeneration is washed with a solution of sulfur dioxide, exchanging the retained sodium for hydrogen. From the exchanger, the sodium bisulfite solution passes through a stripper (where excess sulfur dioxide is stripped out for resolution), then back to the pulp digestion plant. Fresh sulfur dioxide is supplied either by burning sulfur or from liquefied sulfur dioxide. And make-up sodium is supplied by soda ash slurry.

Most important feature: the process is virtually unaffected by the presence of calcium. Since calcium is present in most of the mined bulk chemicals used to make up the sulfite liquor, it is almost always found in the spent liquor, offers a problem to ion exchange (*CW, May 20, p. 55*). But pilot-plant tests with Permutit Q demonstrated that even when calcium amounting to 16% of the total base in the feed liquor (expressed as sodium) was passed into the column, cycle after cycle, no buildup of calcium took place on the resin. Capacity dropped to 1.8 lbs./cu. ft. immediately, after which there was no further capacity reduction.

Sault Tests for Small Mills: These results have been confirmed in a 1-ton/day (pulp) pilot plant installed at Abitibi's Sault Ste. Marie sodium sulfite pulp mill, which employs an average of 248 lbs. of soda ash and 205 lbs. of sulfur per ton to make an unbleached "No. 1" pulp. A wood chip mixture of spruce, pine and balsam is cooked in four digesters at a ratio of about 4.5 parts liquor to 1 part wood; the pulp and liquor are blown into wood-stave blow-pits; and roughly 80% of the liquor is recovered. The pilot runs showed that over 80% of the sodium in this liquor could, in turn, be recovered by the Abiperm process, allowing an over-all recovery of 64%.

Using data from these runs, Abitibi engineers made economic studies for plants with 80, 160 and 225 tons/-day pulp capacity. Depending on plant size and soda ash requirements for the pulping process, investment ranged from $431,000 for an 80-tons/day plant to $880,000 for a 225-tons/day plant. Payout periods ranged from 6.8 to 3.3 years. This assumes, however, credit for only the recovered base. The process delivers an essentially ash-free liquor for chemical recovery of lignosulfonates.

PROCESSES

Amalgam Electrolysis: Continuous removal of sodium in a mercury amalgam is the key to a Hungarian process that's claimed to make economical the recovery of sulfuric acid and sodium hydroxide from sodium sulfate.

In the new process, developed by Joseph Kerti, the cathode of the electrolytic cell is a bed of mercury lying underneath the water solution. Liberated sodium metal immediately amalgamates with the mercury, while liberated sulfate radicals combine with water to form sulfuric acid and oxygen. At the same time, the amalgam is drawn off to a decomposition cell, where the sodium reacts with water to make hydrogen and sodium hydroxide, and the regenerated mercury is recycled. Concentrations: sulfuric acid, 40%; sodium hydroxide, 60%. Current efficiency: 90%. Chemolimpex Trade Corp of Budapest is licensing the process.

•

Titanium Dioxide: An improved process for making titanium dioxide, developed by LaPorte Titanium Ltd. (London), has been submitted for Australian patent (application No. 63,-631/60). Any tetrahalide (except fluoride) vapor and an excess of oxygen are passed through a fluidized bed at 750-1500 F. The tetrahalide is oxidized to the dioxide. A part of this titanium dioxide remains in the bed while the rest is entrained in the gas stream leaving the bed.

Aluminum chloride is incorporated in this gas stream. The oxygen pass through the bed contains enough excess oxygen to convert the aluminum chloride into the oxide.

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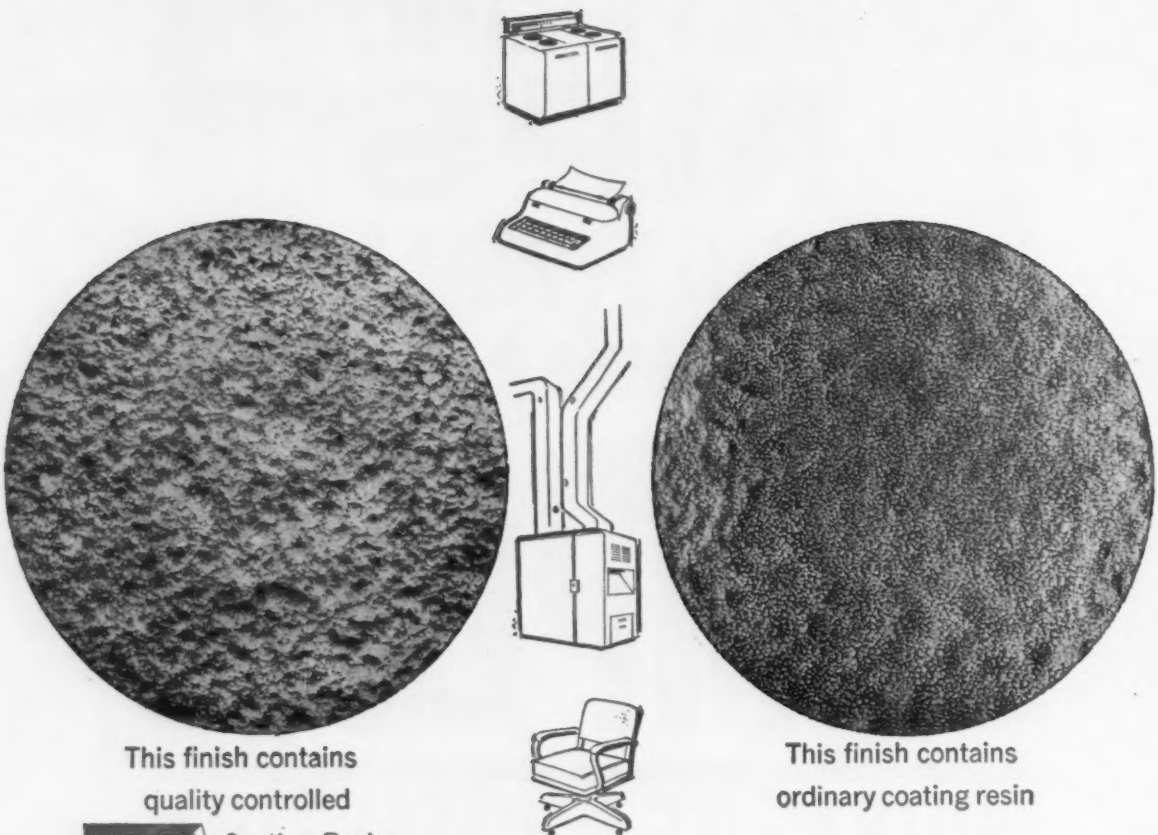

This finish contains quality controlled Plaskon Coating Resin

This finish contains ordinary coating resin

Compare these two unretouched photographs of hammertone finishes on "24 gauge" steel panels. Notice the more uniform pattern and freedom from mottling in the finish on the left. It is made with quality controlled Plaskon Coating Resin. Poor quality raw materials can cause the blotchy, irregular appearance so obvious in the right hand panel.

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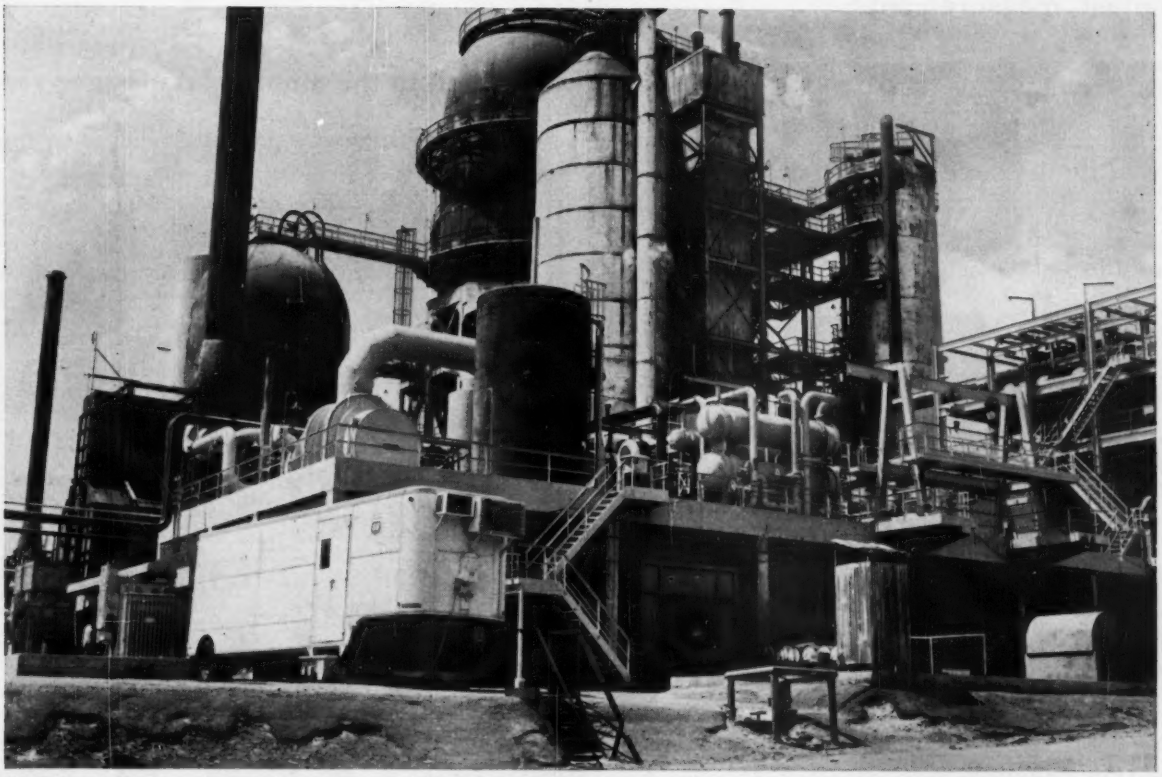
BASIC TO AMERICA'S PROGRESS

Dresser Electronics offers lease plan for mobile data loggers that wheel into plants, tap process streams to study operating improvements.



Mobile data-logging trailer (lower left) squats beside cat cracker at Phillips' Borger refinery.

New Lease on Plant Improvement

In Houston, Tex., Dresser Electronics' SIE Division this week inaugurates a new plan—to lease as well as sell mobile data-logging trailers. The novel program enables chemical companies to run computer studies of plant processes at different locations without hefty investment.

It could help make commonplace such now-rare scenes as the one shown above—a data-logging van at Phillips Petroleum Co.'s Borger, Tex., refinery. The chemical industry has shown strong and growing interest in temporary on-the-spot use of data loggers, but it has been kept from buying the necessary equipment by discouraging price tags, which put the loggers in the category of a high-cost plant experiment.

Although chemical companies that have designed units so far haven't revealed costs, all such units are prototypes that probably cost well over $100,000. And only a few firms—e.g., Phillips, Monsanto Chemical and Shell—have braved these development costs to obtain the advantages of mobility in data logging. Mobile units are used to gather plant operating data leading to process improvements that can be maintained without permanent on-line computers. The logger is moved to another process, after finishing a job.

Phillips Petroleum's unit, designed and outfitted by the instrument and automation branch of Phillips' Research and Development Dept., has been in use for about 18 months at Sweeny and Borger. Monsanto Chemical's unit, designed by the company and built by Southwestern Industrial Electronics (before it became a Dresser division), has been in service at the Texas City plant for about 10 months (*CW, Dec. 10, '60, p. 77*).

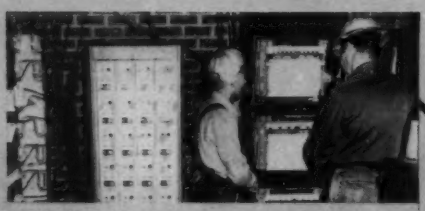
Shell, one of the earliest users of mobile data logging, developed a unit about 10 years ago at Emeryville, Calif. This was used at several locations to gather data for engineering studies. Recently, the engineering development group at Shell Chemical's Deer Park, Tex., plant designed a new mobile system for gathering and interpreting data. It's being assembled by Dresser in a trailer and should be ready for use early this summer.

Leasing Costs: Companies that decide to use Dresser's new lease plan

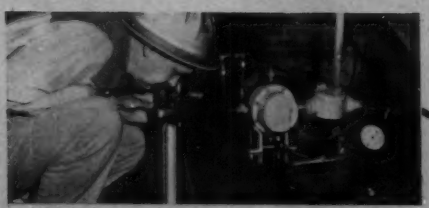
(*Text continued on p. 80*)

HOW MOBILE DATA-LOGGING WORKS FOR PHILLIPS

In-plant measurements:



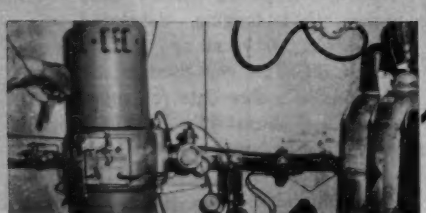
PRESSURES



DENSITIES

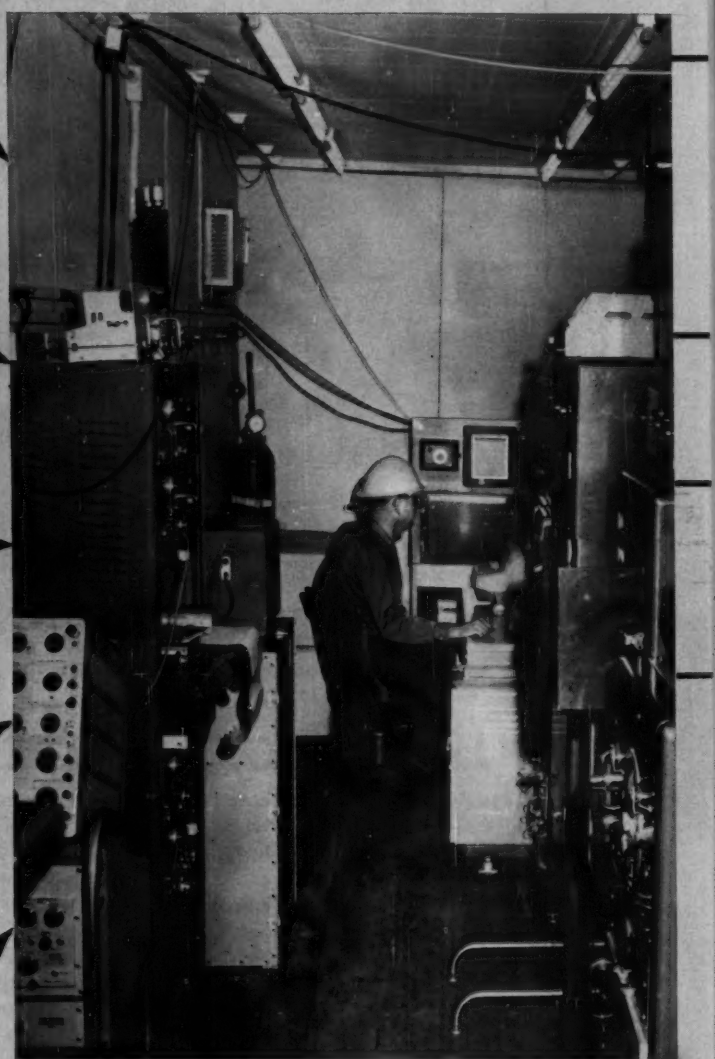
REACTION END-POINTS

FLOW RATES

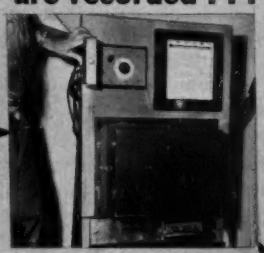


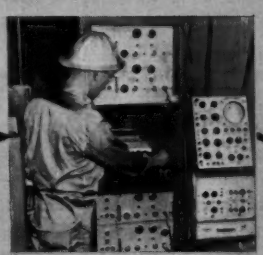
PROCESS-STREAM
COMPONENT ANALYSES

. . . are transmitted to the mobile data-logger van.

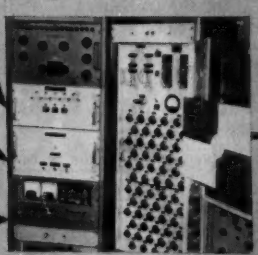


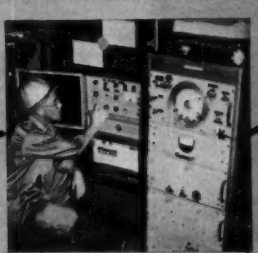
In the van, the measurements are recorded . . .



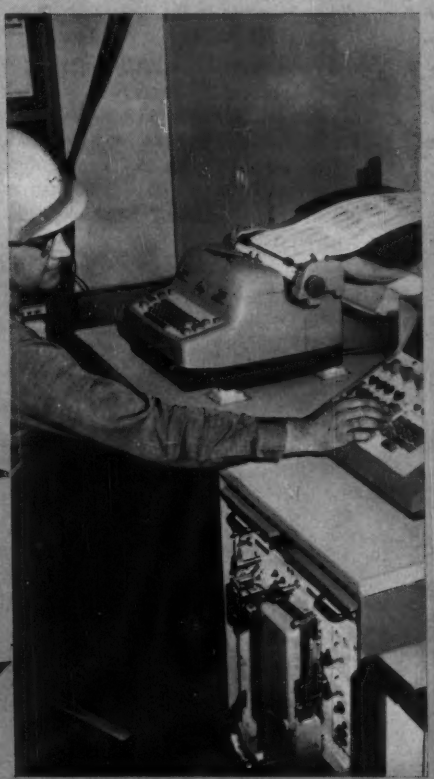


. . . and converted (analog into digital), clocked (digital), sequenced (all signals),





. . . specially sequenced for chromatographic analyses.



The properly sequenced signals are fed to the digital computer.

The mobile computer's dynamic data (process-stream operating measurements) are transmitted to a central computing facility for correlation of heat and material balances, yields, efficiencies, etc., with data from process studies.

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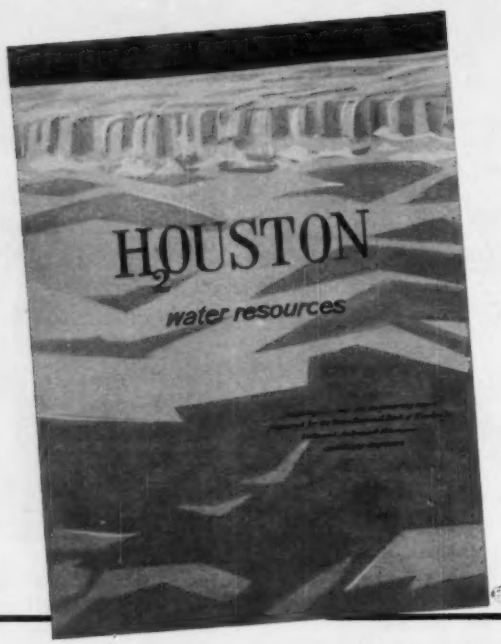

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(*Text continues from p. 77*)

will be charged costs determined by prorating unit selling prices over a period that would be considered normal payout time for the unit. Exact leasing terms would depend on the type and complexity of equipment required. Selling price for complete trailer units would be $50,000-125,000.

While leasing can save chemical companies investment cost, it can't save them the complex study required to determine what equipment is needed for the trailer.

For example, a study of computing facilities must be made. Dresser's selling prices do not include the cost of a high-speed digital computer that would be installed in conjunction with the unit. Users that do not have the facilities could work through Dresser with consultants and service companies.

Monsanto did not put a computer in its Texas City trailer; it has sent some data tapes to its IBM 704 computer in St. Louis and rented time on a local computer for faster service with other tapes. In Shell Chemical's new Deer Park trailer, a Packard-Bell PB 250 digital computer will be included.

A computer in the van assures rapid processing of data tapes, but it limits the choice of computers to the smaller models—and, of course, ups the van cost.

The Big Picture: The main problem facing firms unfamiliar with mobile data loggers has been the lack of a clear picture of what logging can and cannot do. Augmenting Monsanto's and Shell's detailed discussions of the equipment that was installed in the Texas City and Emeryville trailers, Phillips tells why and how mobile data loggers are used advantageously.

Phillips tried data logging because its ordinary plant test programs for process improvement couldn't provide for the rapid assimilation of large volumes of data. The logger provided a broader range of more accurate data, enabled Phillips to test the most promising operating and control techniques, run economic evaluations in the plant and revamp procedures, controls and equipment for best process operation.

For example, at Phillips' ethylene plant at Sweeny, the mobile logger

Shell has three benzene-producing refineries, located near waterways. Barges like these will carry the bulk of 1961's record output.

BULLETIN:

Shell has increased benzene production to meet your rising needs—capacity now exceeds 80 million gallons per year

Shell has increased its benzene production nearly 500 percent in less than 18 months. Shell's benzene-producing capacity in the U. S. is now the largest in the world.

Shell's stepped-up output comes to you via a nationwide supply network served by 3 refineries.

Read how Shell's increased benzene production can help you meet your rising benzene requirements now.

WITH DEMAND for benzene at an all-time high, and with new uses coming along each year, Shell is producing more benzene now than ever before.

Bigger supplies now

Shell has stepped up production of benzene again. Shell's capacity has already topped 80 million gallons of high purity benzene. *And Shell has nationwide facilities for producing and distributing benzene.*

Widest distribution

Shell Benzene is produced at three refineries. At Wood River, Illinois; Houston, Texas; and Wilmington, California.

NOTE: All three refineries are located near waterways. You can take delivery of Shell Benzene in barges, in tank cars and transport trucks. Deliveries can come direct from the refinery.

Manufacturers choose Shell Benzene when precise control is vital. Its quality is consistently high.

And it is free of Thiophene.

For full facts on Shell Benzene, contact your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL
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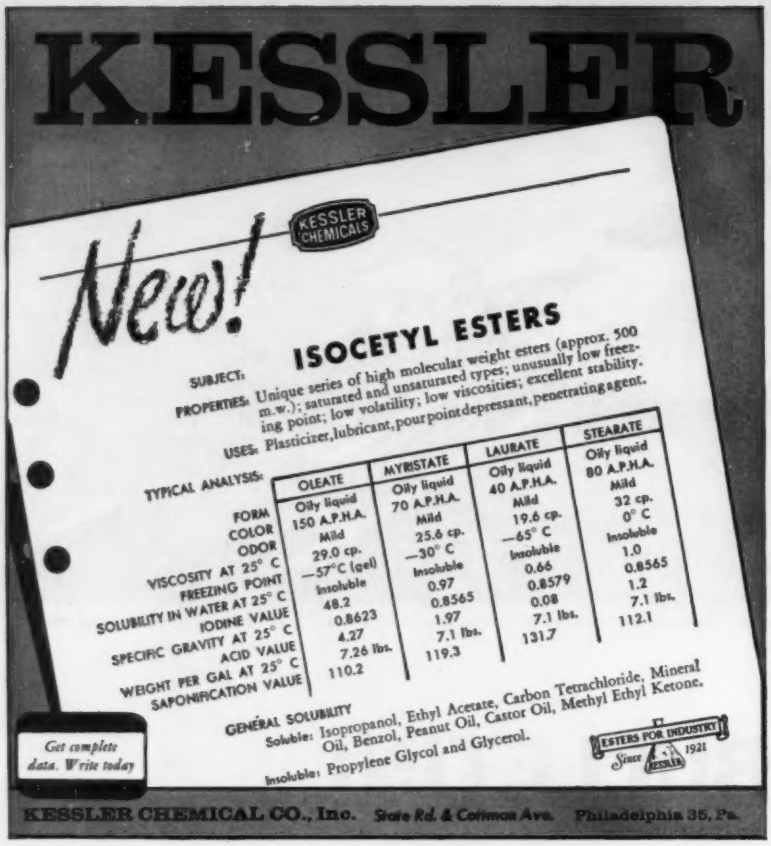

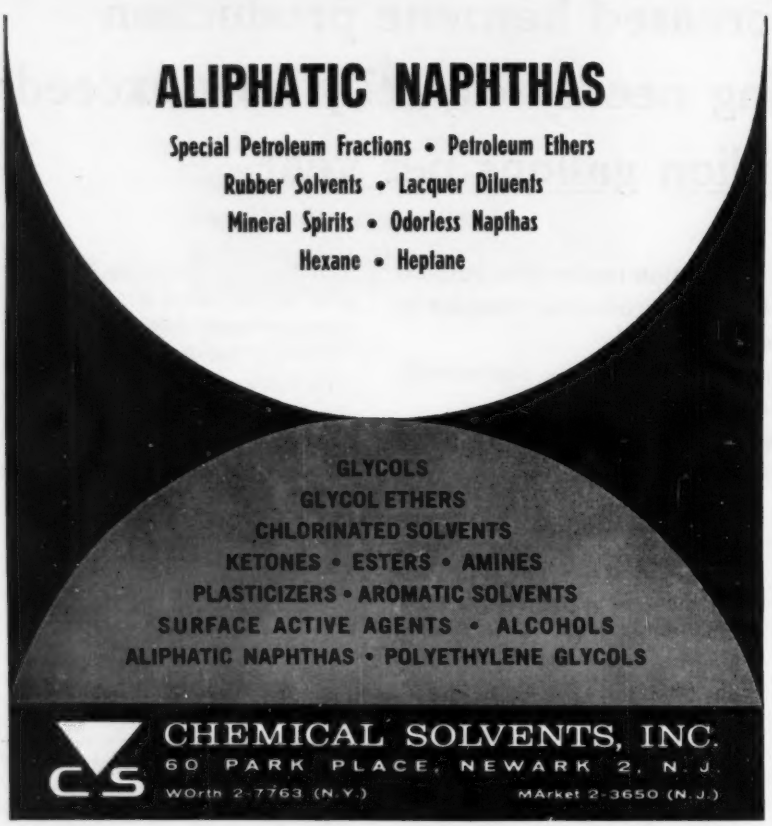

was tapped into thermal cracking furnaces, which crack light hydrocarbon feedstocks. The relationships between ethylene yield and process variables—e.g., carbon buildup inside furnace tubes, pressure drop, tube-metal temperatures, conversion of feedstock to product and product distribution in furnace effluent—were studied.

Result: ethylene production was increased 10%, paying for the study within a few months. The production increase was maintained without a permanent computer-control installation. (It was also found that an additional 6% increase in furnace capacity could have been obtained by using permanent on-line computer control, which, however, would have been uneconomical.)

To obtain data for studies, Phillips finds that additional equipment is often needed to augment plant instrumentation. For example, automatic end-point analyzers and continuous specific-gravity instruments have proved helpful. Special onstream chromatographs with cycle times of a few minutes are quickly set up by use of a new chromatographic data-handling system (*CW, June 10, p. 40*).

Although much of the additional equipment can be placed in the plant (e.g., behind control panels), Phillips says only a mobile logger can handle the required continuous-data reductions. Existing control rooms, the firm says, just don't provide the proper environment for digital computers. Moreover, the extra people needed to operate the equipment would interfere with normal control-room operation.

However, plant personnel are required on the study team, in addition to specialists in areas such as mathematics, reaction kinetics, process dynamics and automatic control. And before the mobile logger moves in, a thorough study of the process must be made on a theoretical basis using available plant and pilot-plant data. Other firms point out that preliminary studies often turn up enough evidence to permit useful operating changes—sometimes significant enough to eliminate the need for data logging and on-line computers. But for penetrating studies, mobile data loggers seem to have an edge, and Dresser's new leasing plan could make that edge more pronounced—and attainable.

CHEMICALS OUTLOOK

June, 1961

This bulletin is published to keep you posted on Wyandotte key chemicals, their applications, and the many services Wyandotte offers. You may want to route this to interested members of your organization. Additional information and trial quantities of Wyandotte key chemicals are available upon request . . . may we serve you?

PERMANENTLY ELASTIC SEALING COMPOUNDS FROM POLYETHERS

Our research has developed a new two-package urethane elastomer from Wyandotte polyethers, suitable for formulating fluid caulking and sealing compounds. The fluid compounds cure to a permanent elastic condition at room temperature and have low raw-material costs.

The final products are non-shrinking, flexible, tough, and highly elastic materials. For field applications, a working life of 6–8 hours can be obtained with a curing time of 24–48 hours. Even shorter curing times are possible for production line applications.

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Fillers of small, uniform particle size such as Purecal® O calcium carbonate provide cured products with improved tensile and tear strength and reduce their cost.

We recommend the use of these new polyether elastomers by the formulators of sealants for architectural applications, clay pipe (factory applied), automobile and truck bodies, boats, aircraft runway and highway expansion joints. For additional information and suggested starting formulas, write for our "SEALANT AND CAULKING COMPOUNDS NEWSLETTER."

REPORT ON CHLORINE SAFETY SEMINAR

During the past 18 months, Wyandotte Technical Service has conducted a Chlorine Safety Seminar at our customers' plants across the country. To date, these seminars have been given 61 times in 45 plants of 32 companies, to over 1,000 people.

The seminar discusses all phases of handling chlorine safely. Topics include: properties, characteristics, and physiological effects of chlorine; handling all types of containers — from cylinders to barges; unloading procedures; how to use gas-masks; and first-aid and emergency measures.

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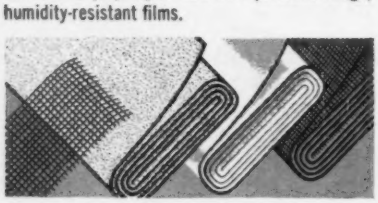

WANT INFORMATION AND SAMPLES?

Raw Materials For Specialty Chemical Processors

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PRODUCTION

Stainless Stands High

Last week Union Carbide Chemicals Co. disclosed results of its year-long tests comparing stainless steel with conventional pipe insulation covering materials.

Since last summer Carbide has installed more than 16,000 ft. of stainless steel-jacketed pipe at its South Charleston, W. Va., plants. The firm says this tryout has shown that the stainless-steel sheathing, produced by Johns-Manville Corp., is stronger and more resistant to fire and corrosion than virtually any other material, including aluminum, mastics, steel.

Although less than 50,000 ft. of this type of jacket are being used today, its popularity will likely grow as process plants move outdoors. By '65, some experts figure, this stainless-steel market will total $5 million/year.

Probably the most significant advantage of stainless: fire resistance. Some chemical firms, including Carbide, insist that all high-temperature insulation covering be capable of resisting direct fire for at least 1 hour.

This requirement limits the choice of materials to two: stainless steel and a fire-resistant mastic (e.g., polyvinyl acetate). Materials such as steel and galvanized metal cannot be used because they don't resist corrosion. Aluminum lasts less than 3 minutes under direct fire, while stainless is still strong after 1½ hours.

Durability Balance: Although mastic has fire resistance and good tensile strength, it has a life of only about 10 years. Stainless insulation covering is estimated to last indefinitely. Aluminum is correspondingly long-lived in neutral atmospheres.

No Cure-All: But stainless steel is no cure-all for plant engineers' insulation covering problems, primarily because of its high cost. Carbide found that cost of installing factory prefabricated stainless-steel insulation sheathing was roughly 8% more than the cost of mastic and 25% more than that of aluminum. But, since stainless has longer life, its cost is probably less when spread over 10-20 years.

Another stainless disadvantage: it's difficult to bend to fit complex parts. However, there's a solution in sight —use of more workable, softer stainless, plus availability of a greater variety of preformed covers.

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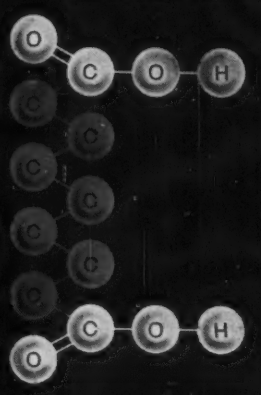

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The recent price decrease for azelaic acid widens its price advantage over sebacic acid and makes it an even more attractive raw material in its many areas of application. Azelaic acid is in wide use now in low temperature plasticizers, alkyd resins, polyesters and synthetic lubricants. And azelaic, produced from domestic raw materials, is in abundant supply with the start-up of Emery's second production facility.

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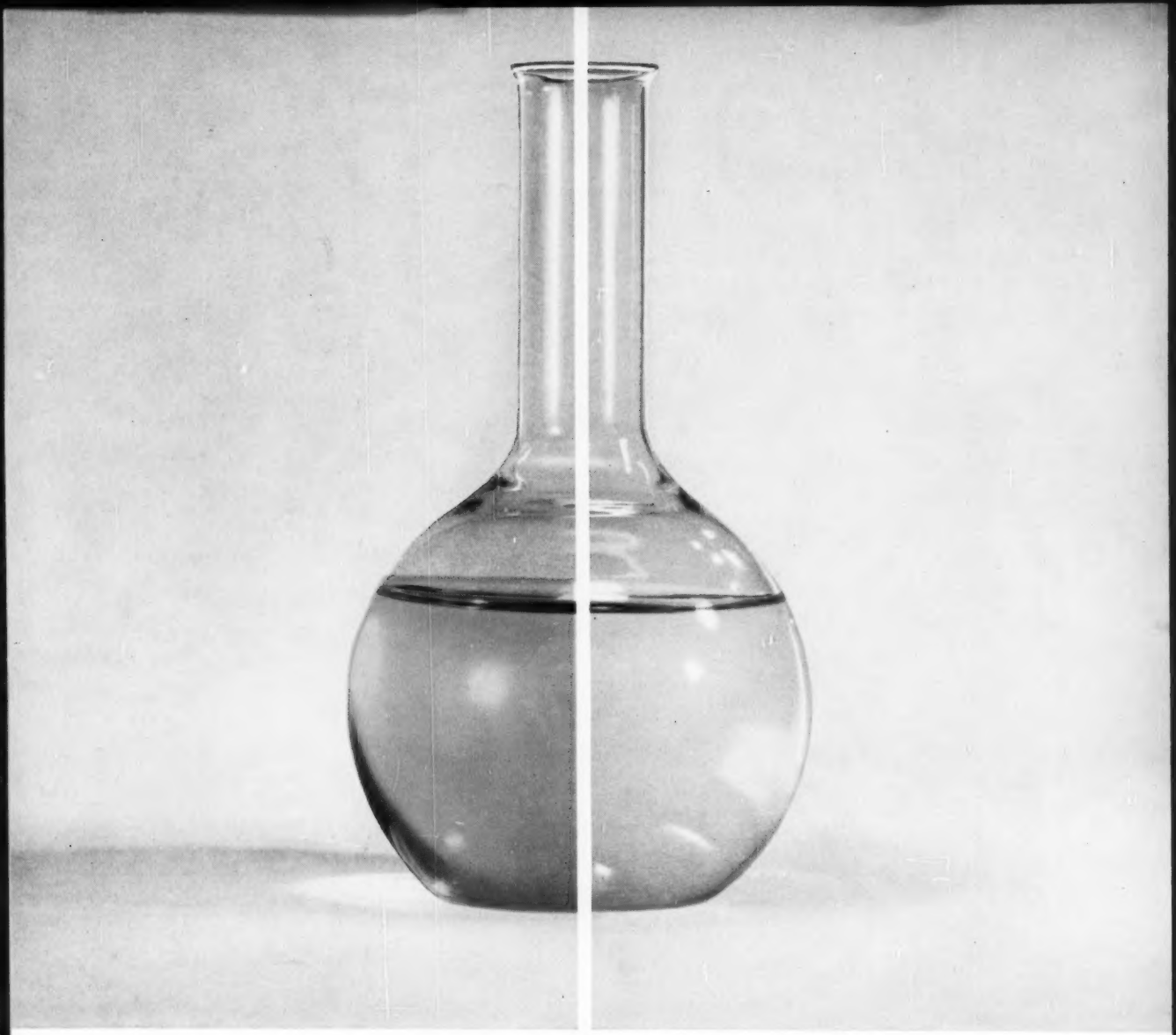

Eliminate color in vinyl plasticizers with new Unitol CMT!

WHEN the esters of most conventional tall oil fatty acids are epoxidized, they develop a red color. Before they can be used in vinyl plasticizers, the color must be removed. This is usually done by washing the plasticizer or by distilling the ester prior to epoxidation.

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WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

Market Newsletter

CHEMICAL WEEK
June 17, 1961

The polypropylene race gets hotter. Rexall Chemical is the latest to reval preproduction commercial marketing plans using purchased resin. The move follows an apparently growing trend in which firms with avowed intentions to enter the polypropylene producing field, first probe the market with material bought from prime makers.

Similar tie-in deals now in effect (with the buyer named first): Du Pont-Hercules, Grace-Montecatini, Carbide-Shell, Spencer-Enjay.

Rexall, which will begin marketing a complete line of molding and extrusion resins July 1, is mum on its source of polypropylene, but an educated guess is that the resale arrangement is with AviSun.

•

And the outlook for plastic film makers gets brighter. Confirmation last week by the Food & Drug Administration that cellophane and polyethylene are safe materials for packaging of foods will spur vigorous market development and, doubtless, considerable competition between competing film materials.

Markets for component chemicals will also benefit. For example, FDA now approves use of high-purity triethylene glycol (containing less that 0.1% diethylene glycol) as plasticizer in cellulosic food-packaging materials. Following approval, Dow Chemical promptly revealed it would market triethylene glycol HP (high-purity) at a premium price of 1½¢/lb. above tabs for the technical grade (now 18½¢/lb. in the East and 19½¢ in the West, in tank-car quantities).

•

Split pricing schedules are retained for fertilizer-grade manganese sulfate, despite Eastman Chemical's $10/ton across-the-board increase. Eastman's new base prices, in bags, 30-ton carlots: $85/ton east of the Mississippi, $90 in the West, except beyond the Rockies, where that tab is now $106/ton. Reason for the hikes: rising cost of manganese ore.

Eastman's new $85/ton price for 75-78% "Tecmangam" remains lower than prevailing published quotes—which have not been increased—of $86.50/ton for lower analysis (65%) fertilizer grade manganese sulfate, also delivered in carlots in the east.

Tennessee Corp.—Another leading producer—confirms the paradoxical pricing, says it sells lower-analysis product at the higher price. Reason: Tennessee's product is primary production material, while Eastman's is a by-product (formed from manganese dioxide, used as a catalyst in manufacture of hydroquinone).

•

Plasticizer buyers may be looking around for some better deals in azelaic ester-type materials as a result of a 3¢/lb. price cut on azelaic acid by Emery Industries. The acid tab is reduced to 37¢/lb. (carloads)

just as Emery's new $6-million ozone-oxidation plant (used to make azelaic and pelargonic acids) comes onstream in Cincinnati.

In fact Emery has already kicked the plasticizer price ball downfield by posting, concomitantly, a 3¢/lb. reduction on its proprietary, azelaic-based Plastolein 9078 LT plasticizer.

•

New prices also mark the near completion of another plant— Continental Oil's petrochemical unit at Lake Charles, La. Conoco's quotes for two Alfol alcohol products (tank cars, delivered east of the Rockies): Alfol 610 (blend of 1-hexanol, 1-octanol and 1-decanol), 18¢/lb.; and Alfol 810 (blend of 1-octanol and 1-decanol), 19¢/lb. Rates for C-12 through C-18 alcohols will be set later.

•

Other price changes that cropped up during the past week:

• Allied Chemical's 1¢/lb. hike on *p*-dichlorobenzene crystals (effective July 1), which puts 250-lb. barrels and 200-lb. drums at 13¢/lb. (carloads) and 15.5¢ l.c.l.; 100-lb. drums will go at 14¢ in carloads and 16.5¢ l.c.l.; 17-lb. drums are put at 17¢ in carloads and 19.5¢/lb. l.c.l.

• Union Carbide's 3¢/lb. across-the-board boost of acetonitrile to 35¢/lb. in tank cars, 37.5¢ in carloads, and 39¢/lb. l.c.l.

• International Minerals & Chemical's $2/ton advance (effective July 1) of chemical-grade potassium chloride to $31/ton; bagged, tag is $36/ton, f.o.b. Carlsbad, N. M.

•

Vinyl copolymers and polystyrene may become obsolete in the manufacture of phonograph records within the next decade, according to C. J. Martin, of the Radio Corp. of America. Martin spoke last week at the Plastics Exposition in New York.

But even if the current 50-70-million-lbs./year market spins into limbo, the changeover to wholly different plastics won't be too abrupt; modified styrene and vinyl materials will likely be used first.

Other plastics that Martin thinks may have record-setting potential include: acetal resins, molding-grade nylon, polycarbonates and polypropylenes. Each type now has some technical disadvantages; a common drawback is high price.

•

The U.S. plastics industry got a benevolent knuckle-rapping, at the New York Plastics Exposition for its alleged short-sighted approach to development of new markets in construction applications.

Paul E. Baseler, of the Building Officials Conference of America, Inc., bemoaned a "consistent lack of information about plastics products supplied," which suggests that either "there is something wrong with the method of evaluating" plastics or manufacturers are "afraid to let us (BOCA) take a good look at them" (*see p. 23*).

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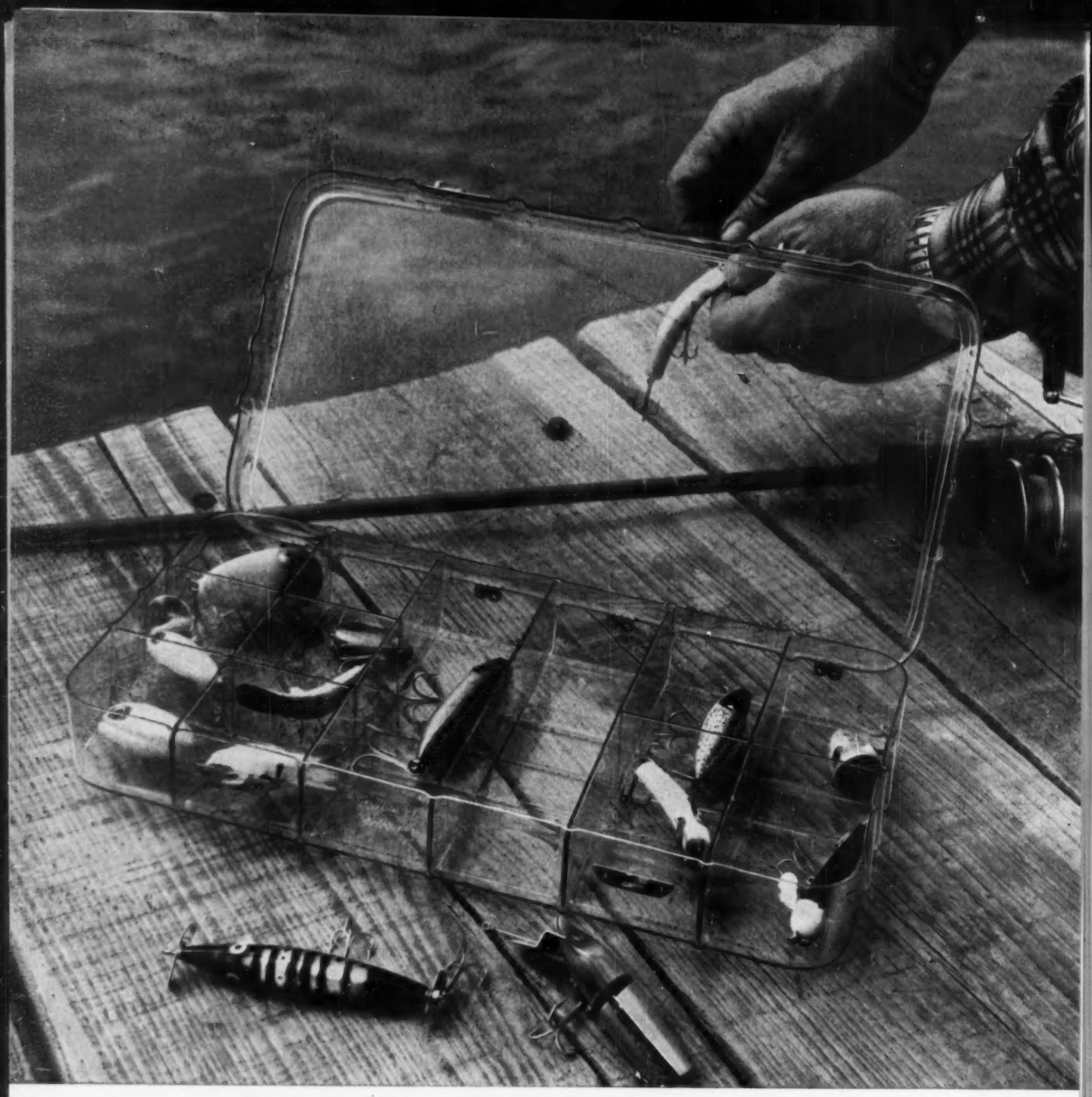

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Benzene Makers Seek an Answer

The days of tight benzene supply —and concomitant over-the-market prices—are just about over. The outpouring of benzene, which could develop into market-glutting proportions, is raising a crop of tough questions that are stumping realistic industry observers.

• How can the trade, over the near-term, possibly absorb the towering benzene overcapacity that is even now being ushered in?

• With the disappearance of premium prices, and spot purchases moving at contract rates, how long will the officially posted industry price of 34¢/gal. hold up?

Too Much, Too Soon: When all the new petroleum-based benzene plants come in—and this includes projects that are planned, under construction, and a couple already in, U.S. benzene potential will be increased about 350 million gal./year (*CW, Feb. 25, p. 21*).

Steel-making operations are accelerating, have already broken the 70%-of-capacity mark, compared with the depressed 50% rates of late last year.

It's estimated that coke-oven operators this month will turn out well over 12 million gal. of benzene. Official figures (for March), placed output at about 9 million gal./month. Nonpetroleum benzene production this year (including tar distillers'), will likely reach 140 million gal.; generally accepted "capacity" is 200 million gal.

And oldline established benzene makers haven't been lax in efforts to wipe out the recent critical shortage. Shell—now the biggest benzene producer in the world—increased its benzene output nearly 500% in less than 18 months, and boosted capacity to over 80 million gal./year solely through debottlenecking and process improvements. Others, too, have stepped up capacity.

All told, U.S. benzene capacity (from new petrobenzene plants, expanded older units, and increasing coke-oven operations) will rocket to over 950 million gal./year before the end of '62. U.S. consumption (including exports) is running about 500 million gal./year. That works out to a potential near-future capacity/demand imbalance of more than 40% —and a headache to present and future benzene producers.

Whither Price? There has been much recent trade speculation that benzene prices would be pressured because of increasing supplies. Some published reports have hinted that a price war could develop. Actually, most marketers discount such talk, feel that economic factors are working against a price break.

When the first petrobenzene plants were built, their output was priced at over 50¢/gal., considerably higher than the then-scarce coal-derived material. But even at this level, the return-of-investment period was a lot longer than producers liked.

This raises the question of how today's potential petrobenzene makers can operate on return of capital expenditures, since current benzene price is only 34¢/gal.—and costs of construction have gone up considerably since World War II.

Another hard nut newcomers must crack: How to break into the market. There are, at the moment, no unattached big benzene consumers—all are tied to relatively long-term contracts either with present suppliers or other upcoming producers.

But benzene contracts generally stipulate that if a customer is approached with a bona fide offer of substantial quantities at lower-than-market price, the supplier has the option of meeting that price or releasing the customer from his contract.

In the severely competitive days ahead, it is unlikely that a lower price offer would not be met; the established supplier will do whatever he can to retain his customer. Result: a lower benzene price; no consumer would switch supplier; and the would-be encroacher would have additional woes. The current 34¢/gal. benzene tag is only reasonably satisfactory for writing off a new plant; a price cut would extend the pay-back period. That, briefly, is why trade observers believe the price will remain firm.

Yet, some major benzene buyers are said to be holding back a little business in the hope that a newcomer to the benzene field will be rash enough to start a price tumble. For large-scale buyers (e.g., Dow, Monsanto), it would seem that such a move would pay off.

But, both Dow and Monsanto plan to go basic in benzene (to supply large benzene requirements for their styrene operations), and a lower benzene price would extend their pay-out period for a new plant, just as it would any other new producer's.

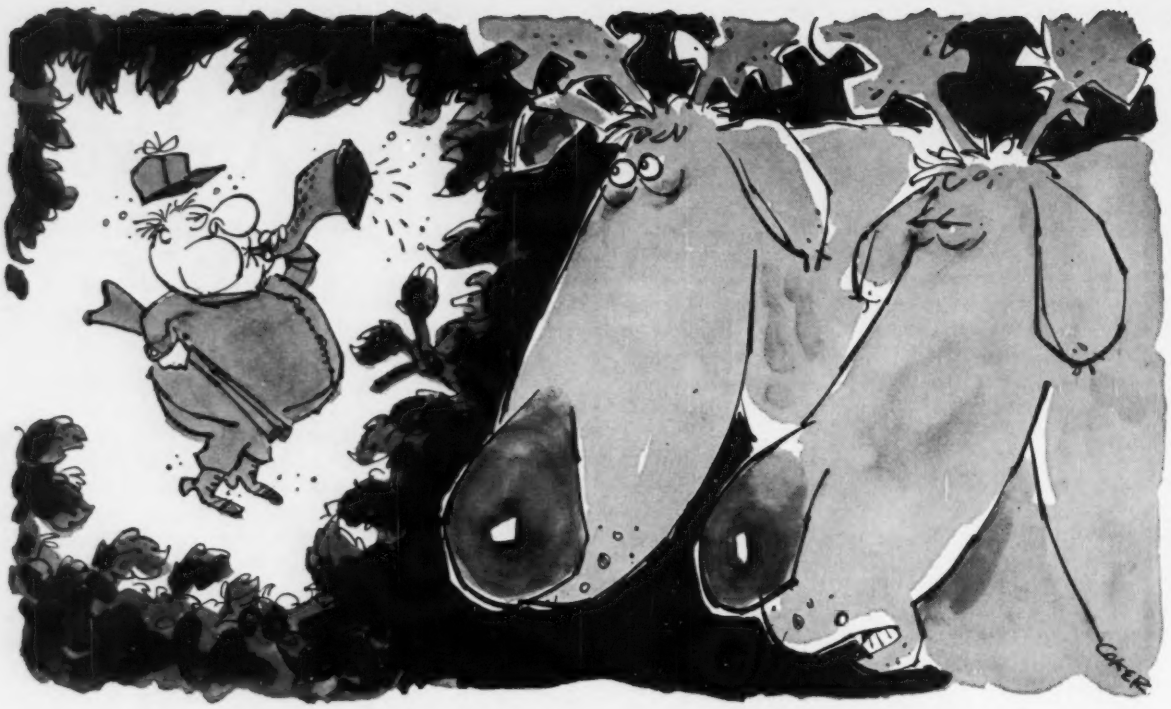
It boils down to this: Established benzene makers and newcomers alike are striving to give the impression that they are girded for an all-out market battle. But over the next five years, at least, benzene outlets aren't likely to expand fast enough to absorb much of the projected overcapacity. It's a case of a battle with no battleground, in the opinion of many.

Chances are, however, that some of the new benzene may wind up in foreign markets. But this would compound a serious situation already taking shape—the reported "dumping" by some producers of U.S.-made benzene derivatives (phenol, maleic anhydride, styrene, polystyrene) into the European market. Some maleic and polystyrene, for example, is said to be going c.i.f. to Italy, at 18-19¢/lb. and 15¢/lb., respectively.

An intensification of this trend could force common market countries to resort to unwanted tariff "protection." The overseas shipments of derivatives, too, are said to be softening the foreign price of benzene more rapidly than supply/demand justifies. European benzene makers, cut out of derivative markets there, are trying to move benzene with lower prices.

Living With the Problem: The materializing obstacles to an orderly inbalance U.S. market, appear nearly insurmountable, at least over the near-term, say some experts.

Many feel that the benzene industry will have to live with the problem of overcapacity until demand catches up. With consumption of benzene expected to climb only modestly, perhaps 5%/year, the latter eventuality could be at least five years off.



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Technical Service at New Turning Point?

CPI turns from expansion of customer service to improvement of service efficiency.

Technical service, one of the CPI's most important selling tools, has hit a turning point this year. The expansion of customer service operations—the enlargement of labs, staffs and budgets — is slowing down markedly for the first time in five years. Behind this change of pace: the "profit pinch," for one thing, and, more important, a matured evaluation of the role played by chemical technical service.

Partly, too, companies are "growing into" their new quarters. Now management is looking for ways to streamline the organizations that were expanded so rapidly during the late '50s. Result: many companies tell CHEMICAL WEEK of significant changes in budget, cost analysis and personnel utilization plans.

Leveled Budgets: While technical service budgets are moving up slightly, there are few big boosts ahead. Rather, companies feel that they can use this money more wisely. Atlas Chemical Industries (formerly Atlas Powder Co., Wilmington, Del.), for example, expects its service spending per sales dollar to decline next year, but hopes to match competition, by "more efficient use of what we already have." Among Atlas' techniques: coordinated project planning in sales, research and product development operations to weed out all but the most needed or potentially profitable programs.

As part of its efficiency plan, Atlas is giving some of its technical service men additional duties. Many other companies are also doing this, including General Aniline & Film's Collway Pigments Division, Hercules Powder's Coatings Division, Commercial Solvents, and Allied Chemical's National Aniline Division. This corresponds to the growing, widespread practice of having sales staffers handle more problems on the spot—e.g., Hercules Powder's plastic salesmen spend almost half their time as technical consultants.

As National Aniline points out, there are several reasons for expanding the service men's duties: it keeps the service team at full strength (even in the event of a business slump); gives the staffers assurance of stable employment; bolsters the output of applied research or quality-control labs, where the technical team lends a hand.

The adoption of technical service programs in which staffers split their time between service work and other duties points up a major difference in companies' approaches to assignment of responsibility.

While some companies have technical service people doing several jobs — e.g., GAF's Antara Division and Hercules' Plastics Division — some of these firms' divisions permit their men to perform only the service role.

In similar fashion, Firestone, Harshaw, Eastman and W. R. Grace have service men doing only service work. They feel that although technical service personnel contribute to sales, research and development, their primary job is to assist customers in solving their chemical processing problems.

Despite these differences regarding single-function vs. multiple-function technical service staffers, it is apparent that some of the divergence stems from different interpretations of what technical service is and where it fits into the sales organization. For example, technical service staffers' responsibilities at Jefferson Chemical illustrate the wide range of jobs a modern chemical technical service man is often called upon to handle:

- Write product technical bulletins.
- Train salesmen and provide them with application information.
- Report industry needs to the research and development staff.
- Assist product application personnel in evaluating laboratory data.
- Measure market use trends by industry.
- Study customers' handling and storage procedures and manufacturing techniques.
- Help develop new uses for existing products.

Where the Money Goes: To get the most out of technical service expenditures, many companies are taking a closer look at how costs vary for different types of service.

Arthur Steele, director of Union Carbide Chemical Co.'s newly opened technical service laboratory in Tarrytown, N.Y., has two estimates: (1) 1-1½% of gross sales volume from both established and new products going to chemical converting industries should support a technical service setup; (2) products aimed directly at the consumer market, as well as process chemicals, require outlays of 5-8% of their sales volume for services. (GAF's Pigments Division, although directing its own service operations with 2 to 2.3% of gross sales volume for less than a year, hopes to hold its outlay at about a similar level for two more years.)

Carbide's spending is based on certain general patterns that turned up in its operations:

(1) The amount of service required per dollar of sales is greater for consumer-market products than for industrial-market products.

(2) Introduction of new products carries a disproportionate outlay for customer service until general product acceptance is achieved.

(3) Chemicals sold into the process industries — lubricants, heat transfer liquids, selective solvents, absorbents, etc.—require more "trouble-shooting" service than is common for chemicals consumed as intermediates.

Nalco Chemical (Chicago) has been able to cut its trouble-shooting costs by a "preventive maintenance" type of service. By equipping its field salesmen with portable test equipment, the firm has cut trouble-shooting calls of its technical service men to less than 1% of all service calls.

Still Expanding: Although the trend is decidedly to more efficient use of existing facilities, rather than expansions, there are some exceptions. This month Eastman Chemical starts moving its customer technical service and

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Fight cancer with a checkup—and a check to the **American Cancer Society.**

product development labs (dyes, organic and agricultural chemicals) into new facilities at Kingsport, Tenn., doubling its room for expansion.

Harshaw (Cleveland) is expanding its solid-state lab—striving for a liaison among its research, development and manufacturing operations. At the same time, it hopes to consolidate under one roof all R&D work of its four divisions.

Pennsalt is also centralizing its sales technical service groups this month in a new, $6-million Technical Center at King of Prussia, Pa. Pennsalt President William Drake, says, "This represents the first stage in an orderly consolidation of Pennsalt's technical services, research, product development and associated functions."

Jefferson Chemical, in addition to its efficiency-boosting steps, plans a 10-15% budget increase for '61-'62. And Polymer Chemicals Division of W. R. Grace is upping technical service expenditures from a five-year average of about 6% to 10-12% next year.

Enjay points out that it has hopes of expanding its service facilities, but reports nothing in work yet. In the meantime, Naugatuck Chemical is completing construction of a technical service center at its main plant (Naugatuck, Conn.).

Better Customers: As the CPI revamps and improves service operations and facilities, many companies feel that customers themselves could help improve the efficiency of technical service teams. Here are some suggestions from chemical firms on what customers could do to get the most from service calls:

- Invest some production time in development or problem-solving — these hours are often quickly regained if results give faster, more efficient operation or greater yields.
- Work conscientiously at trying suggested new products or procedures. Many profitable ideas are lost if instructions are ignored or new products are tested haphazardly.
- Put more confidence in technical service men — even though producers aren't expected to share trade secrets, especially if they are potential competitors.
- Recognize some measure of obligation to the company supplying the service. Often, a customer turns to other suppliers after one supplier has developed or improved its products, formulations or processes. Main reason: price.

Competitive Service: It's clear that growth in chemical technical service facilities and personnel isn't matching that of the mid-'50s. But there will be more deliberate growth, and the demands made upon such services will remain high, for most CPI marketers count on technical service to help win and keep customers. Thus, with chemical marketing in its most competitive decade, the ability of technical service to pay off will be watched more closely than ever.

Packaging Glossary

Packaging men now have available one of the most complete glossaries of packaging terms published to date. The 172-page book, "Glossary of Packaging Terms—Third Edition" ($3.50), is the first effort to gather terminology agreed upon by government agencies, military forces, packaging associations and private industry.

The book is divided into three parts. The main section lists standard definitions of trade terms used for packaging materials, processes, methods and machinery. Two appendices list standard weights, measures and descriptions of how container dimensions are taken and recorded.

In addition to its application by industrial users, the glossary is included in Federal Standard 75a as the authority on terminology for anyone dealing with government agencies.

Work on the book, which took almost five years, was coordinated and financed by Packaging Institute (342 Madison Ave., New York 17). The institute cites the Containers and Packaging Division, Business and Defense Services Administration, for supervising the government agency contributions. The Navy Dept.'s Bureau of Ships assumed responsibility for standardizing terminology used by the Army, Navy and Air Force.

The first two editions of the glossary ('5. and '55) were primarily civilian efforts. Emphasizing the scope of this new edition, Packaging Institute notes that the biggest accomplishment was finding agreement among all branches of the government and armed services.

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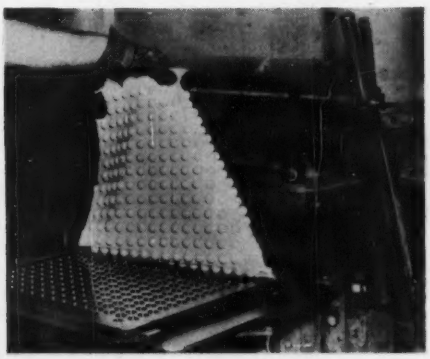

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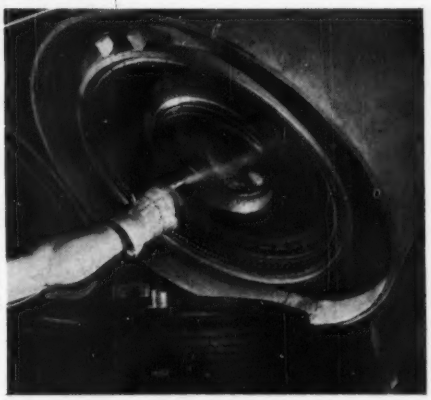

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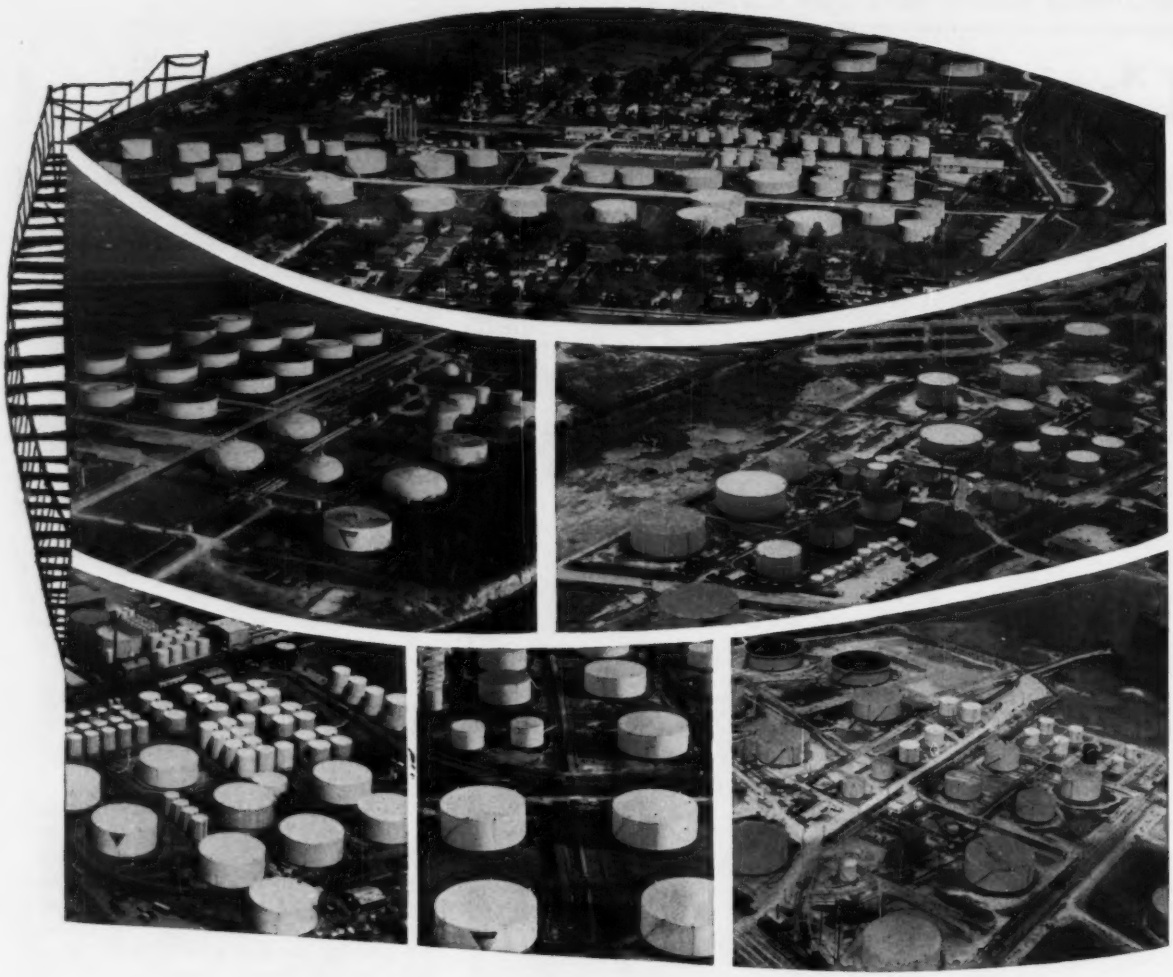

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Going the Water Route

Several new terminals and a new deep-sea tanker highlight the continued rapid growth of water-shipping of chemicals, both in the U.S. and abroad.

The new tanker—the 3,656 deadweight-ton *Santai Maru*, owned by the Mitsui group of companies—recently began moving cargoes of petrochemicals from Houston to Japanese ports. It is the first Japanese tanker to make the Japan-Texas run, will primarily carry cyclohexane, *o*-xylene and benzene. Mitsui also plans to build and operate other tankers for the fats and molasses trades.

More Chemical Terminals: The opening of new terminals in Chattanooga, Tenn., and South Norfolk, Va., plus plans for others in Providence, R.I., Muscatine, Ia., and Purfleet, Essex, England, steadily expands world water-distribution facilities.

The new Tennessee River Terminal in Chattanooga will eventually handle virtually all kinds of liquid chemicals (packaged and bulk) as well as dry bulk commodities. Bulk storage facilities for liquid chemicals, petroleum products, liquefied gases and vegetable oils will cover some six acres of the 14-acre site. The unloading of a 610,000-gal. toluene shipment at the terminal two weeks ago marked the completion of this first stage.

Later facilities for handling packaged chemicals will include units for boxing, bagging, canning and drumming a wide variety of dry and liquid chemicals. Office space and laboratory facilities are also available at the new terminal.

The newly opened South Norfolk terminal is a 102,000-bbls.-capacity petroleum products distribution plant owned by Tidewater Oil Co.

Ammonia Competition: Monsanto Chemical Co. will start building a 15,000-tons-capacity anhydrous ammonia storage terminal on the Mississippi River near Muscatine this month. Completion is scheduled for December. This may be a move to keep the company competitive with Ortho Division (California Chemical), putting a big ammonia plant into operation at nearby Fort Madison, Ia.

Cities Service Oil Co. plans to construct an asphalt storage terminal

chemical processors!

An over-the-fence oxygen plant will deliver nitrogen as well with

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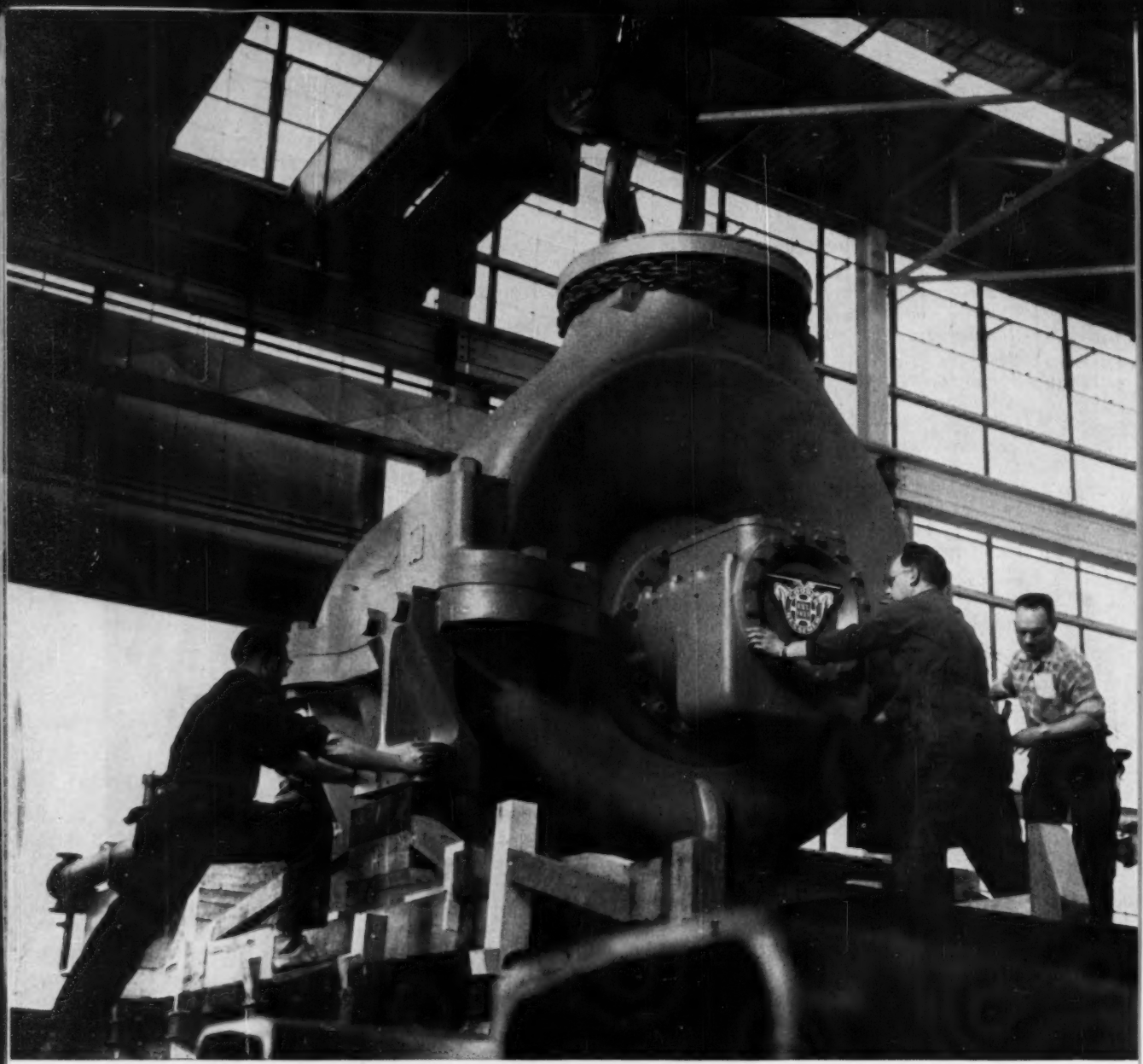

Another Cooper-Bessemer centrifugal goes to work

Here's proof of compressor economy

When your plans call for centrifugal compressors, it will pay you to be guided by the experience of others. Take a tip from the *repeat order* record of Cooper-Bessemer centrifugals as a sure sign of *cost-saving performance.*

The Cooper-Bessemer centrifugal shown here is being shipped to a chemical manufacturer for big volume compression. They *know* how reliable C-B centrifugals really are. Another unit has been operating there 'round-the-clock for two years, as part of a process, where constant availability is a *must.*

Repeat orders for Cooper-Bessemer centrifugal compressors have come time and again from many progressive companies.

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near Providence. It will receive asphalt shipments from the New York-New Jersey area by barge.

British Terminal Plans: A huge British petroleum and petrochemical storage terminal to be built in Purfleet by Cory Bros. and Co. Ltd. will cost some $3.5 million and eventually will have storage capacity of more than 600,000 long tons. Total capacity will be somewhat less than that for several years until all construction at the Purfleet location is completed.

The Powell Duffryn group of companies (of which Cory is a member) now is a petroleum and petrochemical distributor in England. It had once been a principal producer of coal.

Development of new water facilities will doubtless strengthen CPI management's confidence in the role of low-cost, bulk shipment of chemical products by water.

Clearer on Cellophane

Cellophane buyers got a break last week when Du Pont and American Viscose Corp. revised their outmoded gauge designations. Their new sales terms state the film yield in square inches per pound. Now, buyers can immediately determine the total film area—or number of packages—a given weight of cellophane will provide.

Gauge designations have in the past reflected the weight of film per unit of area—300 gauge indicated a weight of 300 decigrams per square meter.

Under the revised system, gauges will be given in three-digit numbers to show the total film yield. Example: 180 indicates a film yield of 18,000 sq. in./lb.

Impetus for the new designations: Du Pont's push into higher-yield films. At the National Packaging Exposition (*CW, April 22, p. 27*), Du Pont's Film Dept. exhibited the first commercial cellophanes having yields up to 25,000 sq. in./lb. To emphasize this, the company has urged the use of new gauge labels.

American Viscose, too, has actively fostered the development of higher-yield films.

For a while, at least, both old and new gauge designations will be carried in sales literature issued by both companies.

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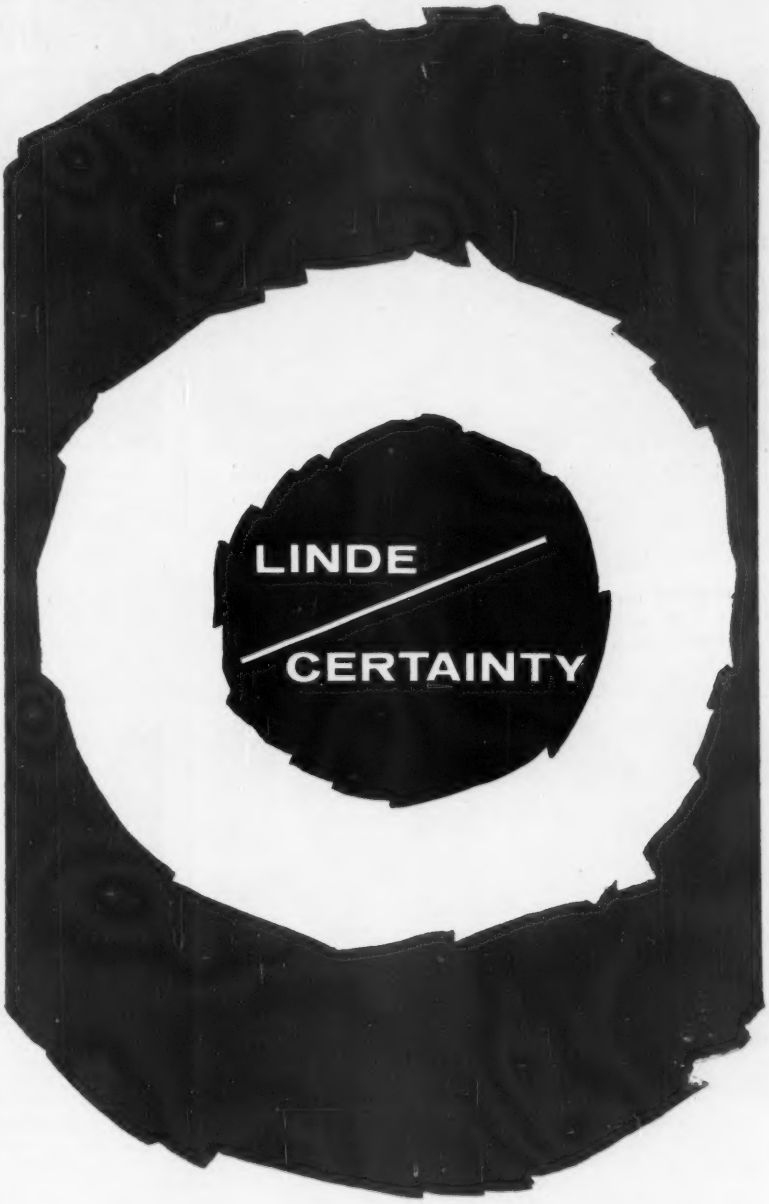
Full automatic control operates your over-the-fence oxygen plant with



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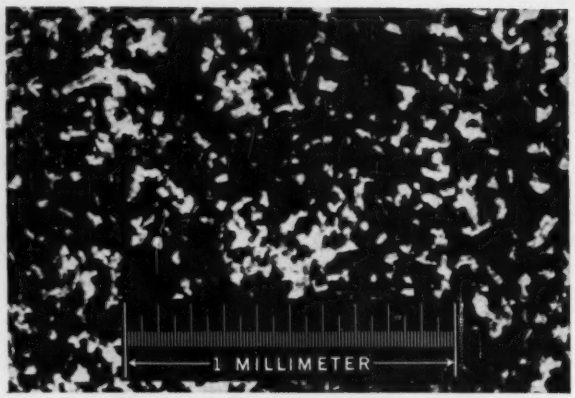
42 Mesh	Trace	200 Mesh	35.0%
100 Mesh	.5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%



Sodium Bicarbonate U.S.P. Fine Powdered No. 3DF for use specifically in dry powder fire extinguisher mixes, also in rubber and plastics blowing, lubricant for sheet vinyl.

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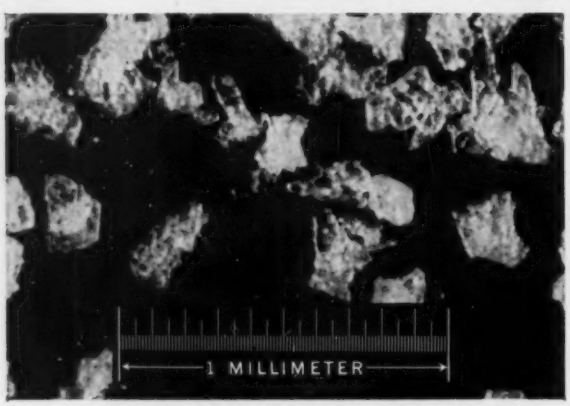

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TYPICAL SCREEN ANALYSIS
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100 Mesh	.5%	325 Mesh	70.0%
170 Mesh	20.0%	400 Mesh	80.0%

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DATA DIGEST

• **Mineral Oil:** Research bulletin reviews applications of whole mineral oils and fully refined hydrocarbon distillates in the manufacture of various plastics. Typical uses: compressor lubricant, catalyst carrier, plasticizer, mold release, etc. Sonneborn Chemical and Refining Corp. (300 Park Avenue South, New York 10).

• **Magnetic Coatings:** Two surveys cite literature references to cobalt-nickel coatings and cobalt-nickel alloy properties. Abstracts are included from 1955-61. Cobalt Information Center, Battelle Memorial Institute (505 King Ave., Columbus 1, O.).

• **Fatty Alcohols:** Brochure describes alcohols and related products produced by Henkel International GmbH. (Dusseldorf, Germany). Fallek Products Co., Inc. (4 West 58th St., New York 19).

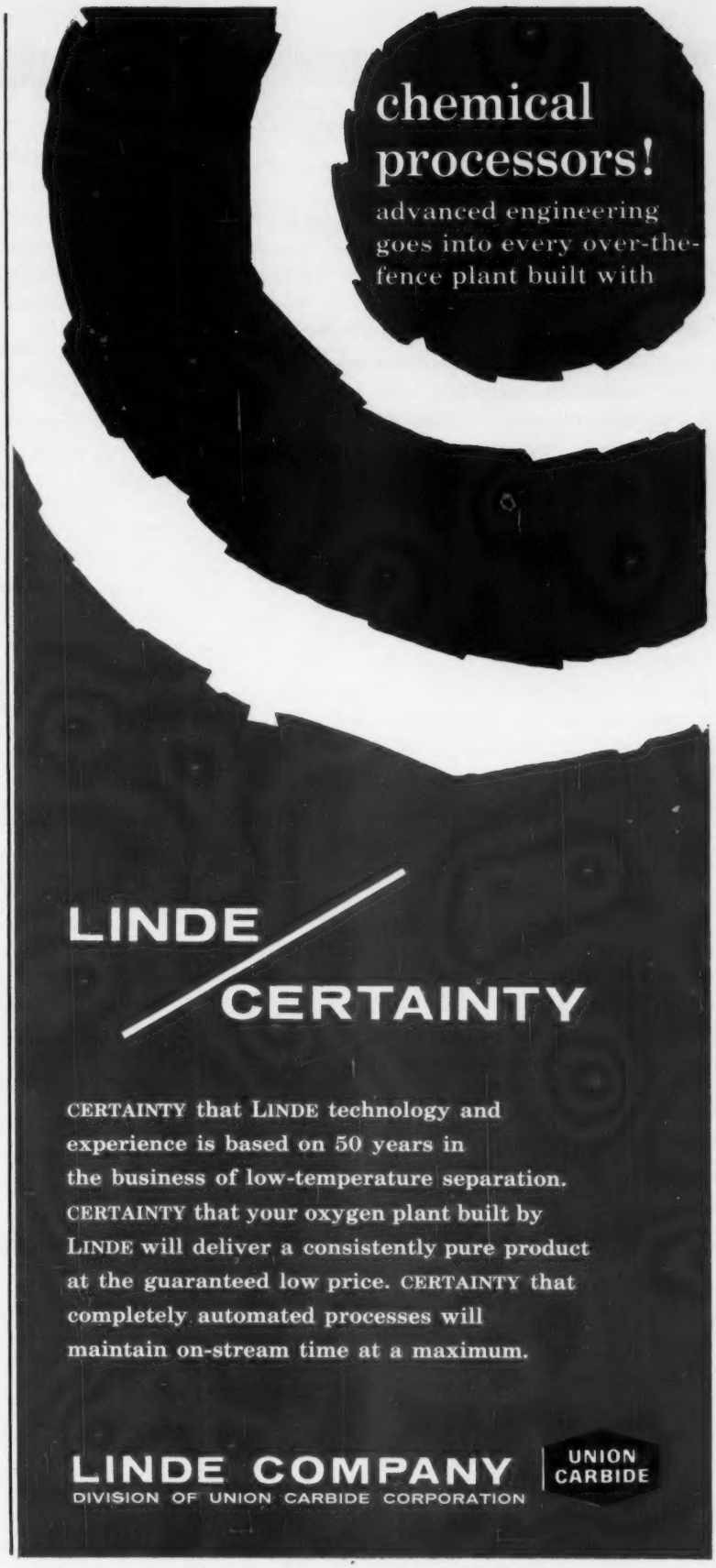
• **Fatty Acids:** New bulletin outlines typical formulations based upon distilled tall oil fatty acids. Included are application procedure, physical constants and test results. Chemicals Division, The Glidden Co. (P.O. Box 389, Jacksonville 1, Fla.).

• **Ceramics Standards:** Brochure ($1) lists physical, dielectric and chemical-resistant property standards for high-alumina (more than 80%) ceramics. Test methods and general manufacturing procedures are also detailed. Alumina Ceramic Manufacturers Assn. (53 Park Place, New York 7).

• **Fatty Amides:** New, 28-page booklet describes new series of amides of fatty acids having 6-22 carbon atoms. Typical applications of these derivatives: solvents, plasticizers, coupling agents, dispersants, lubricant additives and corrosion inhibitors. C. P. Hall Co. (5245 West 73rd St., Chicago).

• **Propylene Glycol:** Technical brochure outlines properties and uses of propylene glycol in the food, beverage, tobacco and cosmetic industries, and as a plasticizer and solvent. Jefferson Chemical Co., Inc. (P.O. Box 303, 1121 Walker Ave., Houston 1, Tex.).

• **Glycol Purification:** Technical bulletin (No. 509) describes the treatment of glycols and polyglycols with sodium borohydride to remove trace carbonyl impurities. Metal Hydrides, Inc. (12-24 Congress St., Beverly, Mass.).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AUCTION

MOBILE, EARTH MOVING, & MISCELLANEOUS EQUIPMENT OF

CAMDEN COKE PLANT

Of The Public Service Electric and Gas Co.

Front & Chestnut Sts., Camden, N.J.

Tues., June 27 at 11 AM (DST) on premises.

RAILROAD EQUIPMENT — Industrial Brownhoist 30 Ton Self Propelled Railroad Crane with 67' Boom (1950); G. E. Diesel Electric 45 Ton 300 HP Switch Engine (1947) Serial 29057; G. E. Diesel Electric 25 Ton 150 HP Switch Engine (1950) Serial 30596; McMyler Steam Railroad Crane; seven 50-Ton Standard Gauge Yard Gondola Cars; three 50-Ton Standard Gauge Yard Side Dump Cars. **EARTH MOVING EQUIPMENT**—2 LeTourneau Super C Tournadozers (1950) with 11' Dozer Blades; LeTourneau Model E-16 Pan Type Scraper 9 cu. yds. capacity (1950). **COKE HANDLING EQUIPMENT** 7 Rubber Belt Conveyors—36" x 253' C to C, 36" x 148', 30" x 57', 38', 29' and 27' C to C and 24" x 5'6" C to C with Head and Tail Pulleys, Idlers and Return Idlers; 6 Hunt, Gyroset, Robbins and Vibrex motor driven Vibrating Screens, 3'3" x 5' to 5' x 8'; 3 Gyroset, Mitchell and Gyrex vibrating units; Penna. 24" x 24' single Roll Crusher, Class B; 7 Clam Shell Crane Buckets 1½ yds to 1¾ yds capacity. **MACHINE TOOLS**—Lodge & Shipley 24/20 x 120" centers Geared Head Engine Lathe (1947) Serial No. 39326; Fosdick 25" Drill Press. **GENERATOR**—A-C 50 KW Generator with Terry Steam Turbine, .8 Power Factor and Pringle Controls, 2 phase, 4 wire. **MISC. EQUIP & SUPPLIES**—Quantity Electric Motors 50 HP to 1/50 HP (40 pieces); Quantity Speed Reducers (7); 20 Chain Hoists ¼ Tons to 3 Tons capacity; 180 HP Buda Diesel Engine; Quantity Tournadozer Spare Parts, Switch Engine Parts, Railroad Crane Parts; Large Quantity approximately 2945 ft. Rubber Conveyor Belting, 16", 20", 24" and 30" wide (mostly new); Quantity CO_2 and 2½ Gallon Fire Extinguishers; Forge & Blower; Anvil; 2 Vises 6 and 10; Lathe Grinder; Pedestal Grinder; 2 Oil Switches; 2 Capacitors, 90 KVAR, 3 Phase; 3 Transformers, 10 and 15 and 25 KW; 2 Diehl Floor Fans; 2 Vent Fans; 2⅓ HP Sump Pumps; 2 3-Sheave Blocks; 4 Chain Hoist Trolleys; 1-R Port Air Pump; Track Jack; 3 Chipping Hammers; Shaw-Box Hoist; Blow Torch.

Exhibition: Friday, June 23 and Monday, June 26 From 10 AM to 4 PM

S. T. FREEMAN & CO., Auctioneers

1808-10 Chestnut St., Phila. 3, Pa.

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

Published: each Saturday—closes 11 days in advance.

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Production Manager, Chemical Engineer, Production and packaging of spray dried detergents. Must be capable of complete management of medium size plant, three-shift operation. Responsible for scheduling raw materials, and production, shipments, quality control, personnel, cost reduction, product improvement, maintenance and purchase of equipment. P-6871, Chemical Week.

POSITIONS WANTED

Management-Chemical Engineer. Experienced plant manager, assistant plant manager, plant superintendent, production superintendent. Broad chemical, fats, oils, food experience. Excellent record. PW-6852, Chemical Week.

Plastics Engineer. M.S. ChE. 10 years extensive extrusion experience in die & machine design, compounding, production, development and sales of film, pipe, sheet, profiles, etc. Want responsible position with future. Advise salary range. PW-6877, Chemical Week.

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MISCELLANEOUS

To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideration.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bonafide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company, "Put Yourself in the Place of the Other Fellow."

BUSINESS OPPORTUNITIES

Chicago Bulk Chemical or Petroleum storage. River front location-railroad spurs. Access to tollways-will build to suit. Send for booklet-Hannah Terminals, Box 89, Lemont, Illinois-BI 2-3210.

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Multi-million dollar chemical plant liquidation at North Little Rock, Arkansas. Stainless Steel tanks, heat exchangers, pumps, pipe, valves, etc.; Pfaudler glass-lined kettles & reactors; Worthington #LTC-4 3500 cfm air compressors; Duriron exchangers & columns; Lead-lined tanks, concentrators, etc. Send for detailed circular. Perry, 1415 N. 6th St., Phila. 22, Pa.

Bird 24" x 38" continuous centrifugal, T304 Stainless conical bowl. Perry, 1415 N. 6th St., Phila. 22, Pa.

1350 gal. T347 Stainless tank, 4' x 14', dished heads, ASME code 60 psi WP, 38 sq. ft. internal coils. Perry, 1415 N. 6th St., Phila. 22, Pa.

2000 gal. Glascote blue glass-lined jktd. reactor, ASME 50 psi int., 90 psi jkt. Perry, 1415 N. 6th St., Phila. 22, Pa.

5 gal. Polyethylene Containers, 10,000. 11" diam. 12" high, 1-¾" opening, glass closure, $35/100 dlvd. nested in ctn. Solvent, acid-proof. Sample $1. 15,000 lbs. $CrNO_3$ 20¢ lb. Solvent vapor recovery eqpt & 20,000 lbs. adsorbent Carbon (1000 gals day capacity) Lesco Products, 5676W-12th St., Detroit 8, Mich.

CHEMICALS FOR SALE

Chemical Grade Iron Powder -20 Mesh. Large tonnage available. Contact: Robert Craig, Micro Metals Corp., 99 President St., Passaic, N.J., PRescott 8-6689

EQUIPMENT WANTED

Wanted-Autoclave and Filter. Autoclave must be minimum 36" dia., prefer up to 60" dia. Filter must have minimum 50 feet filter area, prefer up to 120 feet, must be aluminum or ss., platen frame type, maximum frame thickness 1". W-6884, Chemical Week.

CHEMICALS WANTED

Surplus Wanted—Chemicals, Pharmaceuticals, Oils, Acids, Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N.Y. HAnover 2-6970.

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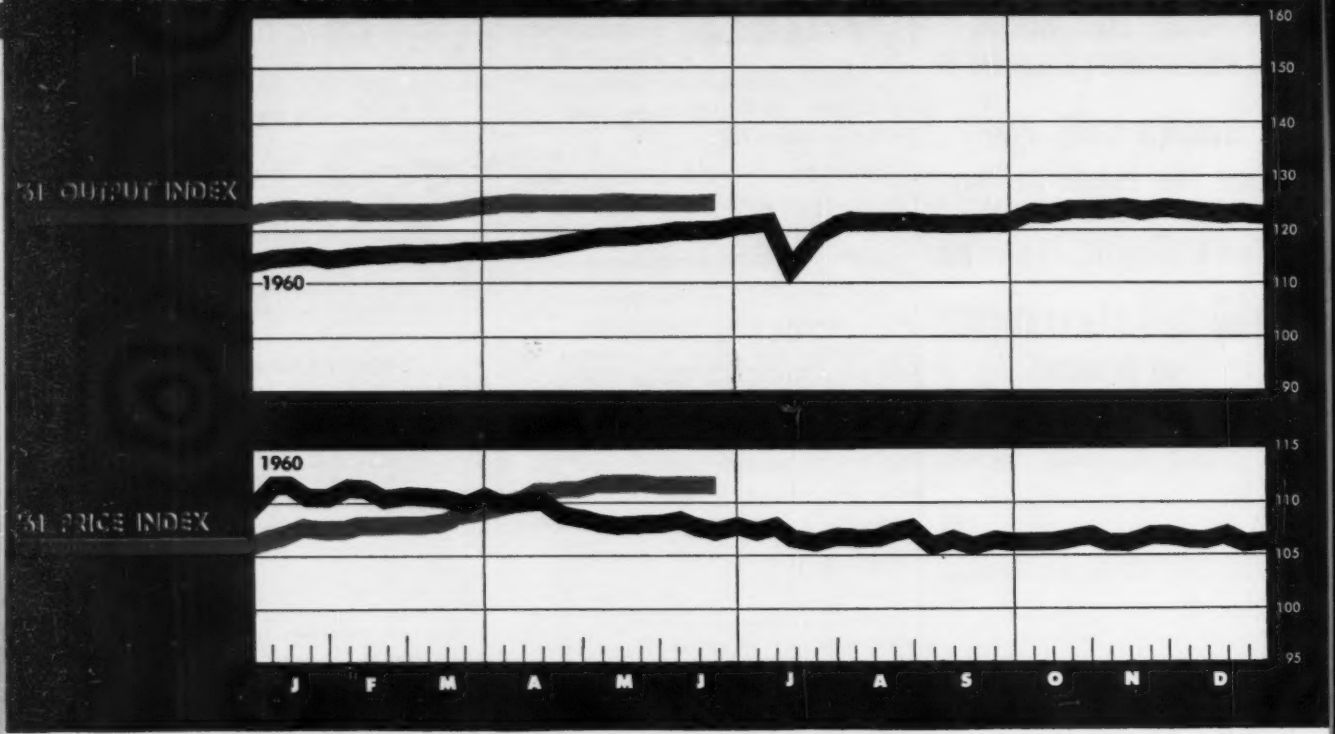


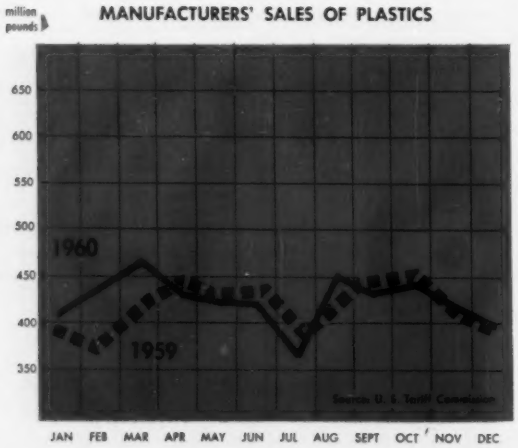
JUNE 17, 1961

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	125.3	125.0	122.2
Chemical Week wholesale price index (1947=100)	111.8	112.3	108.0
Stock price index (12 firms, Standard & Poor's)	53.97	53.23	52.45
Steel ingot output (thousand tons)	2,052	2,077	1,726
Electric power (million kilowatt-hours)	13,887	14,390	13,503
Crude oil and condensate (daily av., thousand bbls.)	7,060	7,054	6,780

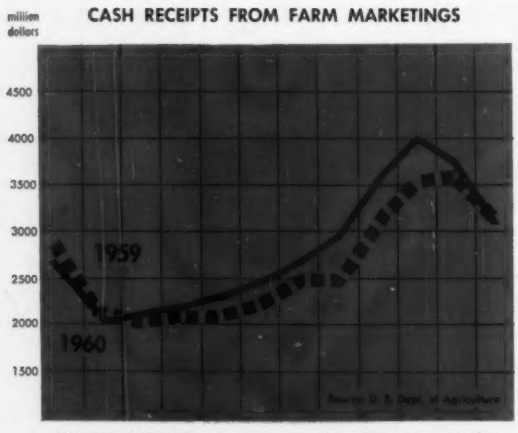
TRADE INDICATORS (Billion dollars)	MANUFACTURERS' SALES			MANUFACTURERS' INVENTORIES		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	29.50	29.03	30.84	53.34	53.60	54.34
Chemicals and Allied Products	2.39	2.30	2.30	4.19	4.19	4.06
Petroleum and Coal Products	3.09	3.18	3.16	3.32	3.32	3.33
Paper and Allied Products	1.09	1.08	1.05	1.67	1.63	1.54
Textile Products	1.14	1.10	1.20	2.76	2.73	2.67

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS



CASH RECEIPTS FROM FARM MARKETINGS



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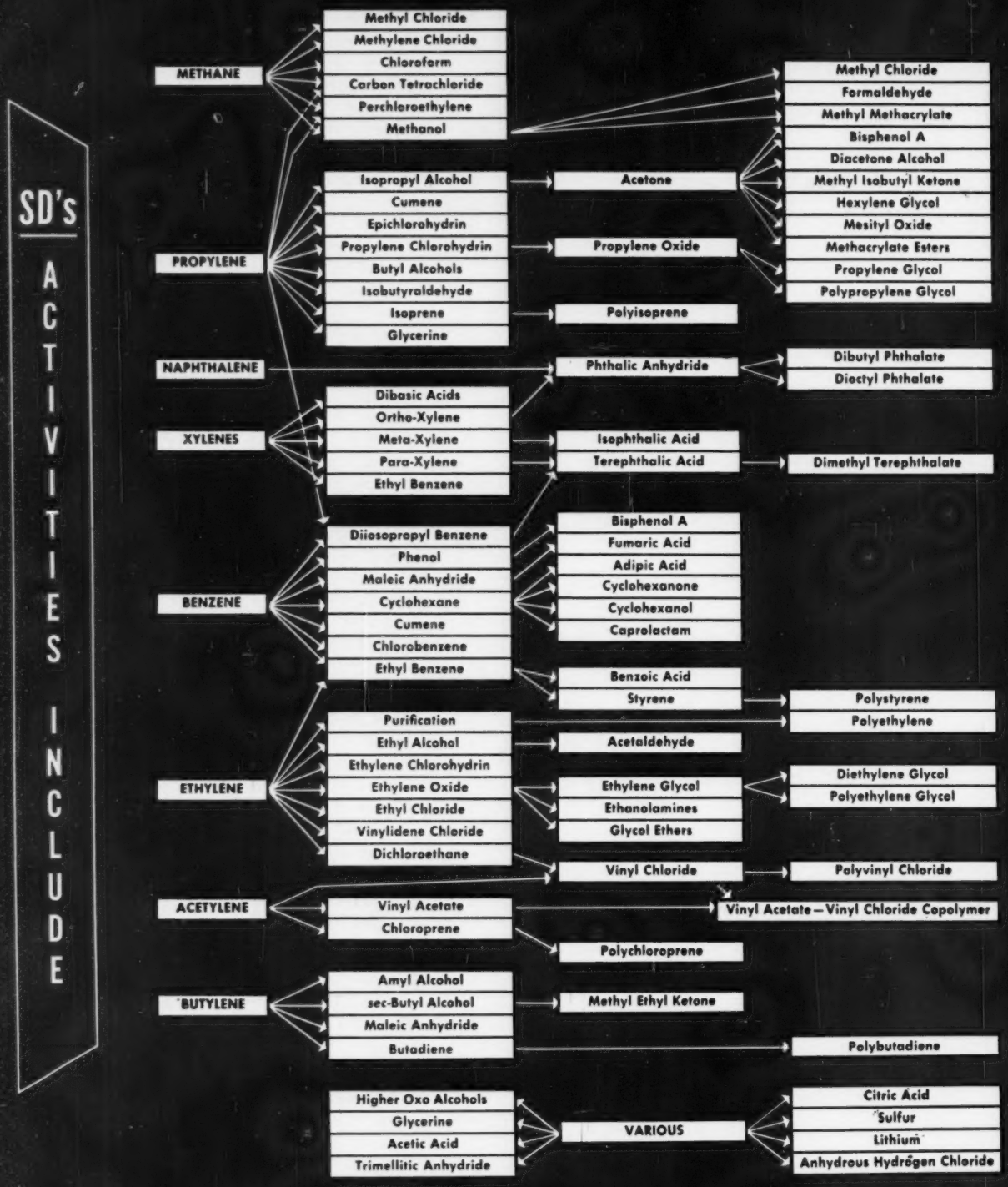

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